# A REVISION OF THE GENUS ARCHIBACCHARIS HEERING. (COMPOSITAE - ASTEREAE)

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## Abstract

Twenty-eight taxa of Archibaccharis are treated, these recognized as twenty-two species with nine varieties. The range of the genus is from northern Mexico to central Panama. Extensions of the known ranges are reported for many of the taxa.

The genus is recircumscribed and divided into two sections. An older name whose validity was previously unrecognized is now cited for the type species of Archibaccharis.

Two taxa are accorded new status and one variety is placed in synonymy. One new combination is reported. One species and one variety are described as new. One name was removed from the genus. Pistillate or staminate specimens of six taxa are described for the first time. One species is reported as probably being monoecious.

Chromosome data is provided for sixteen taxa. New evidence of evolutionary significance is reported.

Taxonomic literature, vernacular names, geographical distribution, morphology, generic-intergeneric relationships, evolution, cytological and pollen data are discussed.

New keys, distribution maps and ecological data as well as floral and chromosome illustrations are included.

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## Introduction

The genus Hemibaccharis was described by Blake (1924) to encompass a group of species "perplexingly intermediate between Baccharis and Conyza" which had "long afforded difficulty to botanists." All of the species of Hemibaccharis were subsequently transferred to the genus Archibaccharis by Blake (1926, 1927).

Following preliminary survey of the literature by the writer in 1967, it was apparent that a considerable amount of basic work could be undertaken, which if successful, might establish a firmer foundation for retention of the genus Archibaccharis. Many taxa were represented in herbaria by a single or only a few collections. Fourteen new taxa described since Blake's work on Hemibaccharis had never been included in a key. The lack of either the pistillate or staminate specimens for many of the taxa as well as the complete absence of any chromosome or pollen data made evident the need for further field work. New keys, the first distribution maps and new ecological data could now be prepared from the more recent and abundant collections available. The need for the present revision was thus evident.

My study of Archibaccharis is based on field and herbarium studies extending over more than three years. The major descriptive portions of the work have been based on the study of my own specimens and approximately 1,900 specimens borrowed from nineteen herbaria in the United States and Europe. Two extensive field trips were made to Mexico and Central America in 1968 and 1969. On the latter trip, seventeen taxa of the genus were collected. Cytological and fruiting materials were collected and used in the determination

of thirteen new chromosome counts. Pollen grains were described and measured. During the summer of 1970, many historical type collections were personally studied at the following institutions: Gray Herbarium, Cambridge, Massachusetts; Royal Botanic Gardens, Kew, Richmond, England; British Museum, London, England; Museum of Natural History, Paris, France; Herbarium and Botanical Gardens, Genève, Switzerland.

The present revision treats all species and varieties of Archibaccharis insofar as known. Further information of a basic nature is still needed for many of the taxa. It is also hoped that future investigations will provide new information regarding hybridization, pollination, biological species limits and chemical constituents.

## Taxonomic History of Archibaccharis

Because the range of the genus Archibaccharis is restricted mostly to the high regions of Mexico and Central America, no reference to any species now assigned to this genus is made in pre-Linnaean literature.

The first descriptions of plants now referred to Archibaccharis were supplied by Kunth (1820) when he described Baccharis serratifolia, B. mucronata and B. micrantha. The The three species have since been shown to be conspecific (Blake, 1930). Many additional species described later were also placed in the Linnaean genus Baccharis because of the obvious morphological similarities to that genus. Other species now referred to Archibaccharis were originally described under Conyza, Diplostephium and Pluchea.

Heering (1904) was the first to recognize the genus Archibaccharis. Blake (1924, pp. 543-554) circumscribed the same genus as Hemibaccharis but in doing so he overlooked Heering's genus Archibaccharis. Blake was informed of his oversight by Dr. Johann Mattfeld of Berlin and Blake (1926, pp.1507-1509; 1927, pp. 60-61) subsequently made the appropriate transfers from the genus Hemibaccharis to the genus Archibaccharis. Blake's early treatment included a key to ten taxa transferred to Hemibaccharis from other genera and six new species described by him. Two additional taxa were listed as doubtful. This early work was somewhat limited because of the paucity of collections from Mexico and Central America. Blake probably deserves to be recognized as the first monographer of the genus since he was the first to bring together all of the previous information including most of that published by Heering even though that work was unknown to him. During the years 1929-1943, Blake described ten new taxa belonging to Archibaccharis. A. Blakeana was described by Standley and Steyermark (1940). The last species to be described before this writing was

A. lucentifolia (Williams, 1962).

The etymology of the two generic names applied to the group has been explained by their respective authors. Heering (1904, p. 39) observed that constant differences were found in the pistillate heads when comparing the heads of some Baccharis species. He decided to name a new genus "since we can imagine the completely dioecious Baccharis species to have evolved from similar forms." Blake (1924, p. 544) proposed to call the genus Hemibaccharis "in allusion to the fact that the staminate plant is indistinguishable from Baccharis." The differences, as viewed by Blake, were to be found in the pistillate heads of Archibaccharis, referring principally to the constant presence of the central disk flowers.

The restudy of the taxa assigned to Archibaccharis has resulted in the recognition of twenty-two species with nine varieties in the present work.

## Generic-Intergeneric Relationships and Evolution

Archibaccharis is placed in the Tribe Astereae which is characterized by having all or only the central flowers tubular; the disk flowers are commonly yellow and the anthers are basally blunt. The style branches are hispidulous outside and the stigmatic lines reach nearly to the apices.

Archibaccharis resembles both Conyza and Baccharis in habit and morphology. Conyza is distinguished by its herbaceous habit and heterogamous, functionally gynomonoecious heads. The marginal flowers are filiform and pistillate. The central disk flowers possess functional anthers and fertile achenes. Baccharis is a normally dioecious genus composed mostly of shrubs. Ordinarily in Baccharis the pistillate heads are composed entirely of fertile filiform flowers with 5-10 nerves on the achenes. The staminate heads are composed of disk flowers with functional anthers but abortive, reduced achenes. A few cases of exceptional heterogamous heads have been reported. Cassini (1825, p. 479) reported subdioecious heads for Baccharis scoparia Schwartz, a Jamaican species. Several instances of the same kind were noted by Cuatrecasas (1967, p. 8) during his recent investigations. My collections of Baccharis glutinosa Pers., Jackson & Saltveit 1012 from Zunil, Guatemala showed an admixture of floral types on the staminate heads. The filiform pistillate flowers appeared to be vestigial as they were small and possessed inane achenes. The disk flowers possessed typically functional anthers and abortive, reduced achenes. Archibaccharis contains herbs, shrubs and vines and to a large degree is functionally dioecious. The pistillate heads are heterogamous in all species but one. In this respect they resemble those of Conyza. The outer filiform pistillate

corollas bear achenes with 2-5(-7) nerves. The central disk flowers are small in number, 1-15(-26), and are usually without functional anthers and achenes. Exceptions are known and will be taken up later in this discussion. These distinctions of the pistillate heads, i.e., presence of disk flowers and number of achene nerves are rather constant features in the genus and are recognized in this study as being well-defined differences between Baccharis and Archibaccharis. The staminate heads of Archibaccharis are often homogamous and identical to those of Baccharis but may be consistently or sporadically heterogamous, the loss of parts and function perhaps being variable in different populations.

The fact that Baccharis and Conyza are morphologically very similar and that certain species which were discovered seemed to be confusingly intermediate between those two genera was recognized by several investigators. Bentham (1841, p. 86), in his description of B. asperifolia noted that the female specimens called Conyza to mind. Hemsley (1881, p. 129) made a similar comment referring to his B. hieraciifolia. Heering (1904, p. 39) based his genus Archibaccharis primarily on constant subdioecious conditions he found in the heads of the species known to him as did Blake (1924, p. 544) when he proposed the genus Hemibaccharis.

Other than differences in the floral composition of the heads, the genus Archibaccharis generally has thinner leaves and its members appear to be less coarse than plants of Baccharis. For example, the phyllaries in Baccharis are usually thicker and coarser than those of Archibaccharis. The triplinerved character so frequently seen in the leaves of the species of Baccharis is seldom weakly suggested as in A. flexilis or sometimes in A. Schiedeana.

As mentioned previously, Archibaccharis has exploited the scandent habit in several taxa. Sympodial stems are very pronounced in Section Hirtella (subscandent shrubs and scandent vines). This character is perhaps being utilized in a unique way by these taxa and is worth special consideration. The sharply fractiflex stems of taxa such as A. hirtella var. albescens and A. Schiedeana appear to be a specialization for support in climbing. The sharp angles formed by the main stems and branches at the nodes (and on branches and branchlets) provide "hooks" which easily become interlocked on parts of adjacent plants. The plant is thus able to climb. Considerable effort is required to completely dislodge an Archibaccharis vine which is so entangled by several multi-directional series of these secured hooking devices. The main stems of A. flexilis differ in that they climb with a twining pattern but the branchlets are noticeably fractiflex and probably aid in obtaining a purchase for climbing. As far as is known to the author, this fractiflex adaptation for climbing is unknown in the genus Baccharis.

Because the habits of both Conyza and Baccharis are

represented in Archibaccharis, that character seemed like a natural point of separation within the genus. Two sections have thus been created. The erect herbs and shrubs have been placed in the Section Archibaccharis and the subscandent and scandent taxa have been placed in the Section Hirtella.

Conyza, Archibaccharis and Baccharis share portions of their ranges. Conyza is a cosmopolitan genus known from both high and low elevations. Baccharis, the largest genus, is found in portions of North America and throughout Central and South America, also occurring at high and low elevations. Archibaccharis is known only from northern Mexico to central Panama. It has been the author's observation that Archibaccharis appears to be found only on relatively recent volcanic soils at high elevations. Some of the author's collections of Archibaccharis point out the affinity for volcanic soils. A. hirtella var. taeniotricha and A. Schiedeana were collected on the upper slopes of mildly active Volcán Pacaya in Guatemala where they were found to be covered with volcanic ash. A. hirtella var. taeniotricha was collected on the edge of the crater of the inactive Volcán San Salvador in El Salvador. These plants were not in flower and were not distributed with my other collections. This information suggests that, as a group, Archibaccharis may differ markedly from either Conyza or Baccharis in its physiological characteristics and perhaps also in its evolutionary potential. In general, Archibaccharis seems to prefer shady, moist conditions. Often the plants are found beside streams or in dense shade. There are exceptions and some species show a broader range of habitat tolerance than others.

Results of the present study provide new evidence that Archibaccharis has perhaps evolved from a herbaceous, probably erect, gynomonoecious ancestor. Morphologically, the genus Conyza provides the nearest ancestral group. Cronquist (1963), while discussing the difficulties of a strict application of the monophyletic requirement, referred to the three genera also under discussion here as examples of evolutionary parallelism. To quote, "although I would not yet want to firmly be committed to this next statement, I suspect that the common ancestor to all species of Baccharis would be Archibaccharis, the common ancestor to all species of Archibaccharis would be a Conyza and the common ancestor to all species of Conyza would be an Erigeron." A very similar statement was repeated in later discussion of the topic (Cronquist, 1968, p. 14). That is, gynomonoecious Conyza-like plants which are now extinct served as the evolutionary progenitors of the dioecious sexual system as now represented in the genus Baccharis. The characteristics of the heads found in the extant Archibaccharis taxa reflects the major evolutionary experiments one can easily imagine occurring in the evolution of a dioecious system. Vestigial rudiments of organs and function loss persist through the genus, furnishing

evidence for suspected monoecious ancestry. The following examples were found:

1) Archibaccharis corymbosa, A. linearilobis and A. subsessilis uniformly have heterogamous heads on both pistillate and staminate plants. The outer filiform corollas have well-developed ligules in the three species. Of real significance is the pattern of evolutionary change shown by the numerical reduction of ray or disk flowers and loss of function in various floral organs of the heads, suggesting evolution to functional dioecism. The outer, more numerous filiform pistillate flowers of the pistillate heads possess fertile achenes. The less numerous central disk flowers have achenes which are abortive, being completely reduced to small knobs or are inane. The anthers of these flowers are non-functional. The outer, less numerous filiform pistillate flowers of the staminate heads have achenes that are perhaps fertile but more often are inane. The more numerous central disk flowers have functional anthers but the achenes are abortive and reduced to small knobs. Thus, in function the dioecious condition is nearly achieved but the heads of both pistillate and staminate plants strongly reflect monoecious ancestry by the presence of heterogamous heads and rudimentary organs which may occasionally function.

2) The central disk flowers on the pistillate heads of Archibaccharis asperifolia, A. caloneura, A. hieraciifolia var. hieracioides, A. serratifolia, A. sescenticeps and A. Standleyi var. aequivenia bear achenes which are apparently sometimes fertile. The anthers of these flowers were found to sometimes be functional or partially so in A. hieraciifolia var. hieraciifolia and A. flexilis.

3) The sporadic occurrence of filiform pistillate flowers on the margins of the staminate heads is known (usually in small numbers) for the following taxa: Archibaccharis asperifolia, A. flexilis, A. hieraciifolia var. glandulosa, A. hieraciifolia var. hieraciifolia, A. hieraciifolia var. hieracioides, A. irazuensis, A. Schiedeana, A. simplex, A. Standleyi var. aequivenia and A. Standleyi var. Standleyi. The achenes of these flowers are apparently sometimes fertile.

4) Archibaccharis androgyna, as represented by all herbarium specimens and as indicated by my investigation of a Mexican population, appears to be functioning in a monoecious fashion with only heterogamous heads as in Conyza but in this case some evolutionary loss is shown in the floral organs. The outer filiform pistillate flowers bear fertile achenes and the central disk flowers have functional anthers and abortive achenes which are reduced and inane. Abnormal intermediate flowers were also found on some heads. This species then presents a condition very close to the ancestral one, at least as the species is now known.

5) Archibaccharis peninsularis, a species which was known

to Blake (1943) by only a single staminate specimen, presents a somewhat different condition. All of the pistillate specimens examined by the author (several recent collections) bear homogamous heads which are provided with flowers of an intermediate type. Although these pistillate flowers are unusual, they seem to be normal for this species. The 2-3(-5) nerved achenes are fertile but the corollas are tubular with five distinct and nearly evenly reduced lobes. Vestigial anthers remained in the tubes. These pistillate heads provide a curious comparison with those of the other taxa in the genus. It is as though in this species a reduced disk flower was selected to serve as the pistillate element. The filiform pistillate flowers throughout the genus are clearly zygomorphic forms. Retention of these aberrant pistillate flowers with concurrent loss of all ray flowers from an ancestral heterogamous head may represent yet a different evolutionary experiment to achieve dioecism. The disk flowers of the staminate heads bear achenes which are apparently sometimes fertile. The anthers are fully functional and the lobes are of normal size. Only disk flowers were found on the staminate heads. Because of the general habit of the species, the number of achene nerves and the pattern of evolutionary loss shown in the heads, it was concluded that A. peninsularis should be retained in the genus Archibaccharis.

6) Although it is perhaps of no direct significance to the evolution of the genus Archibaccharis, abnormal intermediate flowers were found on the pistillate heads of the following erect taxa: A. asperifolia, A. caloneura, A. hieraciifolia var. hieracioides, A. panamensis, A. serratifolia, A. sescenticeps and A. simplex. The abnormal flowers of these taxa exhibited complexes of characteristics which gave them an appearance "intermediate" between that of normal ray and disk flowers. The lobes were variously fused and reduced, usually with some form of zygomorphy. The number of corolla lobes varied as did the degree of fusion. Varying numbers of vestigial anthers were often found within the corolla tubes. That they were sometimes partially functional was evidenced by the presence of pollen grains in at least a portion of the anther sacs. The style branches were often mixed as to type, one as in the ray flowers and the other as in the disk flowers. The achenes were apparently sometimes fertile. Sketches of these abnormal intermediate flowers have been included with those of the normal flowers of a taxon. In this study these abnormal flowers have been interpreted as representing the products of irregular development sequences. Several examples of abnormal intermediate flowers have been reported in the genus Baccharis (Cuatrecasas, 1967, p. 8).

The most primitive extant species of Archibaccharis would be suspected to be a rather small, erect, herbaceous plant and perhaps bearing eglandular pubescence. A. simplex from

the highlands of Puebla and Vera Cruz, Mexico is such a plant. The highlands of central Mexico may be the center of dispersal for the genus and its evolution may well be related to past tectonic events throughout its range.

If the morphologic evidence provided by this study is accepted as reasonable to support the hypothesis that Conyza, Archibaccharis and Baccharis have indeed developed through parallel evolution and if our classification system is to attempt a real reflection of evolution, the retention of the genus Archibaccharis is perhaps justified. A case could easily be made for inclusion of this genus as a section of the genus Baccharis. The three genera could be united if one believed that differing reproductive mechanisms furnish little reason for separating otherwise similar groups. As pointed out elsewhere in this study, the three genera do not appear to differ in basic chromosome number or in pollen characters as viewed with the light microscope. The genus Archibaccharis should perhaps be regarded as a step in the evolution of Baccharis to achieve the dioecious condition.

## Species Concept

Morphologically, the species and varieties of the genus Archibaccharis are quite distinct. The categories have been established on that basis and the morphological comparisons are supported with the geographic distribution patterns.

No data have been accumulated on biological species limits which may only be assumed at present. Chromosome number proved to be of little value in establishing categories as all reports indicate identical haploid and diploid numbers.

The level of variety in this study has been applied in two senses which were summarized by Davis and Heywood (1963, p. 100). The term may designate consistent morphological variants of species which occupy a rather restricted geographical area or it may be applied to variations in taxa whose "precise nature is not understood" such as my use in the establishment of three varieties of Archibaccharis hieraciifolia. The latter use of the level of variety does not exclude the conditions of incipient species or the transfer of germ plasm between taxa. Information of this nature is not available for the genus Archibaccharis.

Although minor vegetative variations were described, they were not recognized with formal or informal categories.

## Cytology

Procedures and materials. In the field the buds were fixed in a solution of four parts chloroform, three parts absolute alcohol and one part glacial acetic acid. This

solution is a modified Carnoy's Solution used in the taxonomic laboratory at the University of Minnesota. The material was transported to the University of Minnesota Herbarium in screw-cap vials. Fruiting material was also collected.

PMC's were liberated from the small anther sacs by first soaking them in acetocarmine for 15-30 seconds. Maceration was accomplished by drawing off the stain with filter paper and then soaking the anthers in 10% HCL for two and one-half minutes at room temperature. After the HCL was drawn off, the anthers were crushed in a drop of stain. The cover slip was carefully lifted and one drop of water-soluble Hoyer's Medium was added. The cover slip was replaced and if additional spreading was required, pressure was applied to the surface of the cover slip with a dissecting needle. The slide was allowed to dry on a warming plate at about 26° C. The technique described above was slightly modified from a method described by Beeks (1955).

To obtain chromosome counts of Archibaccharis Pringlei and A. Schiedeana, it was necessary to germinate seeds to obtain meristematic root cells. The seeds germinated well in petri dishes without special treatment. Root tips were harvested at mid-afternoon and received cold pretreatment for twelve hours at ca. 6° C. They were changed to .002 oxyquinoline solution for four hours at about 52° C. The fixative used was the same modified Carnoy's Solution (4 : 3 : 1) referred to in the discussion of field fixation. The period of fixation was 1-2 hours at room temperature. The tips were then passed to Warmke's Solution for 12-15 minutes and received three water rinses in the vial. 1N HCL was applied at 60° C in a pre-heated oven for ten minutes and then rinsed in water (Darlington and LaCour, 1962). Maceration was accomplished by razor blade in a drop of acetocarmine. The squash and mounting in Hoyer's Medium was essentially the same as the technique described by the author for the preparation of the meiotic material. All mounts prepared in Hoyer's Medium are very satisfactory and have cleared as they have aged.

Discussion. A major collection and survey of chromosome numbers in the Tribe Astereae by several investigators has recently been in progress (Solbrig, et al., 1960, 1964, 1969). The modal number for the tribe is held to be x = 9 by these investigators at both the generic and the species level.

The first chromosome numbers for the genus Archibaccharis were reported as n = 9 (Solbrig, et al., 1969, p. 349). The widely distributed A. asperifolia and A. Schiedeana were the first taxa reported. The author's chromosome reports (Jackson, 1969) confirmed the counts of these two species and in addition established the first reported counts for thirteen other taxa of the genus. All taxa reported have a haploid number of n = 9 and the somatic counts of A. Pringlei and A. Schiedeana were reported as 2n = 18.

The author would like to take this opportunity to record name changes in the original chromosome report (Jackson, 1969, pp. 435-436). The classification employed at that time was as understood according to Blake. Subsequent revision requires that the following changes be reported:

1) Jackson 1017, Archibaccharis hieracioides Blake to A. hieraciifolia Heer. var. hieracioides (Blake) J. D. Jackson.

2) Jackson 1025, Archibaccharis hirtella (DC.) Heer. var. intermedia Blake to A. hirtella (DC.) Heer. var. albescens J. D. Jackson.

3) Jackson 1030, Archibaccharis oaxacana (Greenm.) Blake to A. hieraciifolia Heer. var. hieraciifolia.

4) Jackson 1037, Archibaccharis serratifolia (H.B.K.) var. paniculata (J. D. Sm.) Blake to A. serratifolia (H.B.K.) Blake.

5) Jackson 1041, Archibaccharis torquis Blake to A. Schiedeana (Benth.) J. D. Jackson.

6) Jackson 1044, Archibaccharis prorepens Blake to Baccharis prorepens (Blake) J. D. Jackson.

Although no instances of polyploid chromosome counts have been reported for Archibaccharis, representatives of two collections studied are suspected of being polyploid individuals. Breedlove 8515 (MICH) is quite similar to the other known specimens of A. linearilobis except for very thick leaves, larger epidermal trichomes and extremely large heads and flowers. Camp 2680 (NY) shows the characters of A. hieraciifolia var. hieraciifolia but is similarly a giant form. The unusually large heads and flowers bear extremely large trichomes as do the stems.

Camera lucida drawings of the chromosome figures are shown in figures 1 and 2. Although the chromosome count of A. flexilis was reported (Jackson, 1969, p. 435) the nature of the preparation was such that a good camera lucida drawing was not possible. The few meiotic cells in the anther sacs of the central disk flowers of the pistillate heads did not provide good subject material.

## Pollen

Pollen grains were mounted in 85% lactic acid during the month of July, 1969, to produce an expanded configuration for study. The length of the polar and equatorial axes were measured. Twenty-five measurements of each axis were completed on samples from each taxon. Five additional grains were measured from a different geographical location to provide verification. In some cases, only one sample was available for a particular taxon. The range of measurements obtained from the grains of each taxon are shown in Table 1.


Fig. 1. Camera lucida drawings of chromosomes of Archibaccharis taxa, all approximately X2200: (a) A. asperifolia, anaphase II (Jackson 1027); (b) A. sescenticeps, diakinesis (Jackson 1047); (c) A. subsessilis, metaphase II (Jackson 1033); (d) A. corymbosa, metaphase I (Jackson 1043); (e) A. serratifolia, anaphase I (Jackson 1048); (f) A. androgyna, metaphase I (Jackson 1034); (g) A. hieraciifolia var. hieracioides, metaphase I (Jackson 1017); (h) A. hieraciifolia var. hieraciifolia, anaphase I (Jackson 1030).


Fig. 2. Camera lucida drawings of chromosomes of Archibaccharis taxa, all approximately X2200. (a) A. hirtella var. albescens, mitotic division of haploid microspore (Jackson 1025); (b) A. hirtella var. hirtella, anaphase I (Jackson 1046); (c) A. hirtella var. taeniotricha, metaphase I (Jackson 1042); (d) A. Schiedeana, mitotic metaphase of root cell (Jackson 1041); (e) A. Blakeana, metaphase I (Jackson 1036); (f) A. Pringlei, mitotic metaphase of root cell (Jackson 1031).

Table 1. Measurements of Polar and Equatorial Axes *Archibaccharis* Pollen Grains (Microns)

| Taxon | Polar axis | Equatorial axis |
|---|---|---|
| *A. simplex* | 20.5-24.4 | 22.7-27.2 |
| *A. campii* | 19.4-24.4 | 23.3-27.8 |
| *A. hieraciifolia* var. *glandulosa* | 23.3-27.8 | 23.9-30.0 |
| *A. hieraciifolia* var. *hieracioides* | 21.2-28.9 | 25.5-30.0 |
| *A. hieraciifolia* var. *hieraciifolia* | 23.3-28.3 | 25.5-31.0 |
| *A. corymbosa* | 13.3-23.3 | 16.7-25.5 |
| *A. Standleyi* var. *Standleyi* | all preparations exhibited deformed pollen | |
| *A. Standleyi* var. *aequivenia* | 21.0-23.3 | 22.2-24.4 |
| *A. subsessilis* | 16.7-19.0 | 19.0-23.3 |
| *A. linearilobis* | 22.2-28.9 | 24.4-32.1 |
| *A. sescenticeps* | 17.8-23.3 | 18.9-25.0 |
| *A. serratifolia* | 16.0-19.4 | 16.7-21.0 |
| *A. peninsularis* | 16.0-20.0 | 17.8-22.8 |
| *A. asperifolia* | 14.4-20.0 | 16.7-22.2 |
| *A. androgyna* | 16.7-22.0 | 17.8-24.4 |
| *A. caloneura* | 22.2-24.4 | 24.6-28.9 |
| *A. irazuensis* | 16.7-21.0 | 18.9-23.3 |
| *A. panamensis* | staminate plant unknown | |

Table 1. Measurements of Polar and Equatorial Axes Archibaccharis Pollen Grains (Microns) (Continued from preceding page)

| Taxon | Polar axis | Equatorial axis |
|---|---|---|
| A. Pringlei | 16.7-18.9 | 18.9-21.0 |
| A. Blakeana | 16.7-20.5 | 18.9-23.3 |
| A. hirtella var. albescens | 15.0-20.0 | 16.7-21.0 |
| A. hirtella var. hirtella | 13.9-17.8 | 15.5-18.9 |
| A. hirtella var. intermedia | 16.7-19.4 | 18.9-21.0 |
| A. hirtella var. taeniotricha | 16.7-21.0 | 17.8-22.2 |
| A. salmeoides | 17.5-21.0 | 19.5-23.0 |
| A. lucentifolia | 25.5-32.1 | 28.9-35.5 |
| A. flexilis | 18.3-23.3 | 18.9-24.4 |
| A. Schiedeana | 15.5-18.9 | 17.8-21.2 |

The taxa in Table 1 have been grouped according to those believed to possess close genetic relationships. The grain sizes might prove to be statistically separable if one wished to perform the appropriate statistical tests. In nearly all cases, the taxa are readily separable utilizing vegetative and floral morphology.

Archibaccharis pollen grains are oblate spheroidal, amb type is angulaperturate (circular open); polar axis 13.3-32.1 microns, equatorial axis 15.5-35.6 microns, grain size from small to medium (Erdtman, 1952); tricolporate, rarely with four colpi, membrane smooth, colpi and pore margins smooth; exine echinate, tectate, finely scabrate (granular) with a few larger projections sometimes located irregularly between the spines, scabrations appearing larger on the spine bases; yellow perine sometimes present.

The general characteristics of Archibaccharis pollen grains do not seem perceptibly different from those of Conyza or

Baccharis when studied with the light microscope. Wodehouse (1935, p. 490) found few differences in "emphytic" characters of the pollen grains throughout the entire Tribe Astereae and further stated that this was in line with the close relationship believed to exist between all the species in the tribe. "The interrelationships of these species are so close that their differences do not come to visible expression."

## Taxonomic Characters

The discussions and descriptions of taxonomic characters in this study are as they are known within the limits of the author's experience.

Habit: The species of Archibaccharis are herbs, erect shrubs, subscandent shrubs or vines. The genus has been divided into two sections on the basis of habit, separating the erect taxa from those which are subscandent or scandent.

Subterranean Parts: All of the taxa collected by the author appeared to possess perennial underground parts. These were either fibrous root systems or rhizomatous.

Stems: The vascular cambia of all of the members of the genus are quite active and develop a considerable amount of secondary wood during one growing season. Tall species such as Archibaccharis corymbosa and A. asperifolia possess quite woody stems with large pith areas but by appearance pass very well for shrubs. Other than this no evidence was found to support observations on collector's labels which described the habit of these two species as "shrubs." Cross-sections of stems indicated only one season's cambial activity. These plants seem to be large herbs which resemble shrubs. In contrast, the stems of A. subsessilis and A. sescenticeps show continuous secondary thickening, persisting for several seasons. The sharply fractiflex (zig-zag) stems of many of the subscandent and scandent taxa provide an excellent diagnostic feature. Archibaccharis stems are generally striate but the angled or terete character is distinctive. The long internode is a useful mark for A. Pringlei and A. Blakeana. Stem color is variable for most of the taxa but often one color predominates. The stems of A. asperifolia are usually reddish-purple but green stems are known. The brown stems of A. flexilis are very distinct.

Leaves: Both sessile and petioled leaf conditions are found in the genus. The length of the petiole can be a very useful character when contrasting two species such as Archibaccharis corymbosa and A. subsessilis, commonly confused because of similar head and floral characteristics. Taxa which consistently have sessile leaves also possess auriculate leaf bases.

The leaf shapes are generally distinctive for the taxa. The bases and apices of the leaves also provide valuable

features.

The leaf texture is distinctive for some taxa although this character may vary within a taxon. The leaves of Archibaccharis lucentifolia and A. salmeoides are always thick and shiny when compared with most other taxa.

The density of leaf pubescence may vary in one taxon or it may be quite consistent. The subglabrous condition is shown by Archibaccharis androgyna and A. caloneura while in A. Schiedeana the leaves may rarely be subglabrous but are usually pubescent on both surfaces. For most of the taxa in the genus, the pubescence on the midribs and the major lateral veins (above and below) is noticeably thicker than on the adjacent surfaces.

Pubescence: This character is quite distinctive for most of the taxa. A variety of indumentum types is found throughout the genus, including glandular hairs. The hairs are usually small and the diminutive form of the descriptive terms describing them has often been applied. The indumentum types have been classified following the descriptions of Lawrence (1955). The density of pubescence may vary from specimen to specimen within one taxon. The density and harshness of the pubescence on stems and leaves were found to vary greatly in single populations of Archibaccharis serratifolia. These characters formerly were the basis for two varieties of that species.

Phyllaries: The phyllary shape is sometimes distinctive as in Archibaccharis salmeoides which has ovate phyllaries. In the descriptions, only the phyllaries of the pistillate heads were detailed. Most features of those of the staminate heads are identical in the same taxon except that they are somewhat broader and shorter.

The phyllaries may bear pubescence which is diagnostic. They may be puberulous as in Archibaccharis subsessilis, glandular as in the A. hieraciifolia complex or glabrous as in A. caloneura.

The shape of the phyllary apex may be consistent within one taxon or sometimes it is variable. As an example, those of Archibaccharis hieraciifolia var. hieracioides are always long-acuminate whereas in A. linearilobis they may be acute or acuminate.

Pappus: The pappus color is often distinct for a taxon. The bristles of Archibaccharis corymbosa are always pink or red and in A. Schiedeana the pappus is brown-tinged.

Corollas: The corolla color is often characteristic of a taxon or a cluster of taxa. The members of the Archibaccharis hirtella complex always have purple flowers at maturity. A. corymbosa, at least in nearly all known collections, consistently has pink flowers which become purple at maturity. More than one corolla color may be shown by one taxon as in A. asperifolia where the flowers may be white or creamy-white. Some taxa present bi-colored corollas. A. salmeoides and

A. lucentifolia have filiform and disk corollas which are white below but purple or pink above.

Most members of the genus possess puberulous hairs on their corollas. The amount and placement of the hairs on the tubes and throats may be a diagnostic aid. The hairs are nearly erect or antrorse and often clavellate or subclavellate. The lobes of the disk corollas may have hairs on the inside and/or outside surfaces in some taxa while these are lacking in others. The ligules of the filiform corollas appear always to be glabrous.

Throughout the genus the ligules of the filiform corollas show various degrees of reduction. The ligules on these flowers of Archibaccharis corymbosa, A. subsessilis and A. linearilobis are always well-developed on both staminate and pistillate heads. The heads have a very distinctive appearance due to the presence of these long ligules. The ligules were measured from the base of the ligular sinuses to the apex.

The lobes of the disk corollas are usually of a constant shape for a taxon although a closely related group of taxa may exhibit similar shapes. The number of lobes per corolla is normally five but abnormal numbers up to ten have been observed.

Style Branches: The style branches of the filiform flowers show no differences which could be considered of great diagnostic value when those of any of the taxa are compared. The style branches of the disk flowers have various shapes which are valuable as taxonomic characters. The Archibaccharis hirtella complex usually shows rhombic-oblong style branches while those of A. Schiedeana and closely related species possess linear or less often, oblong shapes.

Achenes: Some of the achene characters are diagnostic for certain taxa. The compressed, oblong, elliptical or ovate shapes appear nearly universally throughout the genus. The color is uniformly whitish during immaturity to brown at maturity. The texture may vary from dull to very shiny and is distinctive for some of the taxa. The achene pubescence is nearly always hispidulous but in a few taxa such as Archibaccharis peninsularis the hairs appear softer and have been termed hirtellous. In A. subsessilis, superficial glands are found on the surfaces of the achenes mixed with hispidulous hairs. The number of nerves per achene is fairly constant throughout the genus but some variation is shown. In the descriptions, only the number of nerves found on the fertile and inane achenes of the filiform flowers were recorded. In general, the achene detail in the descriptions was drawn from these flowers found in the pistillate heads where it is most clear.

## Terminology

Because of the complexities of the heads and floral organs of Archibaccharis, the following special terms employed are defined.

Abnormal intermediate flower: a flower appearing abnormal in that it bears a mixture of characters, some of which are usually associated with filiform ray flowers and some with disk flowers.

Abortive: in general, achenes that are defective, barren or imperfectly developed; inane achenes and those reduced to small knobs or stipitiform shapes are termed abortive.

Dioecious: sexes separated by virtue of being on different plants (in Baccharis, also in two different flower forms).

Fertile: achenes that are full and completely formed.

Gynomonoecious: when fully functional hermaphrodite and female flowers are borne on the same plant (in Conyza, also on the same heads).

Heterogamous: composite heads bearing both filiform ray and disk flowers, the ligules of the ray flowers sometimes much reduced.

Homogamous: composite heads bearing only one of the two types of flowers, i.e., either composed wholly of ray flowers or wholly of disk flowers.

Inane: an achene which is fully formed or nearly so but is empty; regarded as an abortive type.

Ligule: the spreading limb of the marginally located zygomorphic ray flowers of composite heads. Flowers which exhibited very little ligule development but were clearly zygomorphic have been treated as "reduced" ligulate (ray) flowers; often referred to as "filiform ray flowers."

Sterile: floral sex organs which are non-functional, producing no sexual products.

## Systematic Treatment

ARCHIBACCHARIS Heering.

Archibaccharis Hecring, Jahr. Hamb. Wissensch. Anst. 21, Beiheft 3: 40. 1904.

Hemibaccharis Blake, Contr. U. S. Nat. Herb. 20: 544-545. 1924.

Perennial, ligneous, erect, rarely spreading herbs, shrubs or subscandent shrubs and scandent vines; ca. 1.5-100 dm tall; above-ground parts usually pubescent, the trichomes of various types. Rhizomes present or absent. As a genus, nearly totally dioecious but the heads often displaying a diminished gynomonoecious condition, either sporadically or consistently. Stems essentially with ascending, rarely lax branches and branchlets at least above, these often axillary bearing immature leaves and inflorescences as well, straight to sharply fractiflex or twining, terete or angled, the bases 0.3-20.0 mm

in diam., graduating to ca. 1.0 mm near the inflorescences, usually striate, variously colored, usually pubescent at least above, rarely glabrous. Leaves alternate, sessile or with petioles 1.0-35.0 mm long; blades variously shaped, membranaceous to coriaceous but usually chartaceous, cordate, subcordate, attenuate, cuneate or auriculate-amplexicaul at bases, acute or acuminate and sometimes falcate as well at apices, margins serrate, serrulate or merely denticulate distally, the teeth mucronate or mucronulate, rarely completely entire, the upper surfaces dark-green, dull or shiny, the midribs and major lateral veins impressed or slightly prominent, the lower surfaces lighter green or darker like the the upper surfaces, dull or shiny, the midribs prominent, the lateral veins slightly prominent. Inflorescences of terminal and axillary panicles which may be cymose or corymbiform, the slender branchlets and peduncles subtended by small subulate or linear bracts, the lowest of which are foliaceous. Heads hemispherical, discoid or disciform due to reduced ligules or distinctly radiate, receptacles nearly flat, alveolate, involucres 3-6 seriate, graduate; phyllaries subulate, triangular, ovate or lanceolate to linear, not coarse, usually somewhat broader and shorter on the staminate heads but otherwise similar to those of the pistillate heads, margins usually narrow and scarious, short or long-ciliolate above and sometimes lacerate as well, nearly white, green-white or purple, centers 1-nerved, green, purple or red, obtuse, acute or acuminate at apices; flowers variously colored, bicolored in some taxa, the corollas puberulous, these hairs often clavellate or subclavellate and nearly erect or antrorse, rarely hirtellous, pappus 1-seriate, barbellate, often contorted at bases, rarely irregular, the apices usually dilated on the disk flowers and sometimes slightly so on the pistillate flowers, variously colored, achenes compressed, ovate, oblong or elliptical when fertile, sometimes inane, stipitiform or nearly totally reduced to small knobs, 2-5(-7) nerved, mostly trigonous, shiny to dull, hispidulous or rarely hirtellous. Pistillate heads: 3.5-15.0 mm high, nearly always heterogamous; the outer flowers filiform, 9-127, the usually erect ligules well-developed or reduced, glabrous, the style branches linear or sublinear, flat with acute or obtuse apices and usually finely pubescent margins, achenes fertile; central disk flowers 1-15(-26), anthers usually sterile, rarely functional, style branches variously shaped, hispidulous, achenes usually abortive, inane or greatly reduced to stipitiform or small knobby forms, rarely fertile; abnormal intermediate flowers sometimes present; in one exceptional species the heads are uniformly composed of tubular intermediate appearing flowers bearing vestigial anthers. Staminate heads: 3.0-10.0 mm high, usually homogamous but always heterogamous in three species and sporadically so in many species; the outer flowers, when present, filiform, 1-23(-29), similar to those of the

pistillate heads but often reduced, achenes apparently fertile but sometimes inane; disk flowers 5-93, anthers functional, style branches variously shaped and hispidulous, achenes usually completely abortive and reduced to small knobs but sometimes inane, rarely fertile; abnormal intermediate flowers rarely present. Heads of the monoecious species: 3.4-5.0 mm high, heterogamous, the achenes of the outer filiform flowers fertile, the anthers of the central disk flowers functional but the achenes abortive, greatly reduced to knobby or inane forms. Recorded chromosome numbers of the genus: n = 9, 2n = 18.

Type species: Archibaccharis hieraciifolia Heering.

Key to Sections of the Genus Archibaccharis

A. Erect herbs and shrubs, the main stems essentially straight or obscurely fractiflex . . . Section I. Archibaccharis.

AA. Subscandent shrubs or scandent vines, the main stems noticeably fractiflex or twining . . . . . Section II. Hirtella.

Section I. Archibaccharis.

Herbae et frutices erecti.

Erect herbs and shrubs, the stems essentially straight or obscurely fractiflex.

Taxa in this section occur from northern Mexico including Baja California Sur to central Panama.

Type species: Archibaccharis hieraciifolia Heering.

Key to the taxa in Section Archibaccharis

A. Stems glandular-pubescent above or at least with some glandular hairs on the branchlets and peduncles; leaves sessile or with petioles and cuneate leaf bases

B. Leaves with definite petioles, even though sometimes short

C. Petioles short, 1.0-2.0 mm long; leaf pubescence eglandular on the upper and lower surfaces; Oaxaca, Mexico . . . . . 2. A. campii

CC. Petioles usually longer, 2.0-20.0 mm long; leaves glandular-pubescent on the upper and lower surfaces; central Mexico . . . . . 3a. A. hieraciifolia var. hieracioides (see BB, also sometimes with sessile leaves)

BB. Leaves sessile, the bases auriculate-amplexicaul

D. Apices of mature cauline leaves chiefly acute

E. Leaf blades usually contracted abruptly but sometimes gradually below the middle to form linear or tapered petioliform portions 2.0-9.0 mm wide, these usually narrower than the widest part of the blades; filiform flowers of the pistillate heads 59-73; Oaxaca, Mexico . . . . . 3. A. hieraciifolia var. hieraciifolia

EE. Leaf blades usually narrowing slightly toward the bases appearing nearly linear throughout or with some of the leaves narrowing more abruptly just below the middle forming nearly linear petioliform portions 3.0-12.0 mm wide, these much narrower than the widest part of the blades; filiform flowers of the pistillate heads 100-127; Guerrero, Mexico and Puebla, Mexico . . . . . 3b. A. hieraciifolia var. glandulosa

DD. Apices of mature cauline leaves chiefly acuminate . . . . . 3a. A. hieraciifolia var. hieracioides (see CC, leaves also sometimes with petioles)

AA. Stems pubescent with eglandular hairs, subglabrous or glabrous above or if glandular-pubescent, the petioles short, (1.0-3.5(-4.0) mm long and the leaf bases shallowly cordate; mature leaves always with definite petioles

F. Stems thickly puberulous, glandular-pubescent, uniformly villosulous or essentially glabrous above except for tomentulose hairs sometimes present on branches, branchlets and peduncles and/or the filiform flowers consistently present on both pistillate and staminate heads, the ligules of these corollas well-developed, exceeding 1.2 mm

G. Ligules of the filiform corollas well-developed on both pistillate and staminate heads, 1.2-2.9 mm long

H. Petioles short, 1.0-3.5(-4.0) mm long; leaf bases cordate or shallowly so, rarely rounded; corollas white, sometimes light-yellow, rarely purple; pappus bristles white or perhaps light-yellow

I. Stems thickly puberulous above; leaf surfaces hispidulous . . . . . 4. A. subsessilis

II. Stems glandular-pubescent above; upper and lower leaf surfaces glandular-

pubescent . . . . . 5. A. linearilobis

HH. Petioles longer, (2.0-)11.0-15.0 mm long; leaf bases cuneate, less often rounded; corollas pink to purple, rarely white; pappus bristles usually bright red or pink at least near the apices, rarely light-yellow . . . . . 6. A. corymbosa

GG. Ligules of the filiform corollas on the pistillate heads (also staminate heads, if sporadically present in small numbers or perhaps these flowers are lacking on the staminate heads) not as well-developed, reduced, 0.1-1.2 mm long

J. Stems thickly puberulous above; lobes of the disk flowers on the staminate heads linear (those of the pistillate heads also linear where known), 1.6-3.0 mm long

K. Leaf blades ovate or lance-ovate, 4.0-6.0 cm long; Honduras . . . . . 7. A. Standleyi var. Standleyi

KK. Leaf blades lanceolate, lance-elliptic or lance-oblong, 6.0-16.0 cm long; southern Mexico and Guatemala . . . . . 7a. A. Standleyi var. aequivenia

JJ. Stems essentially glabrous above except for whitish tomentulose hairs sometimes present on branches, branchlets and peduncles or with whitish arachnose-tomentulose hairs above and on branches, branchlets and peduncles; lobes of the disk flowers of the staminate heads variable, oblong, linear, triangular or merely acute, 0.7-1.5 mm long

L. Tall herbs(?); stems terete, green or purple, shiny, essentially glabrous or whitish tomentulose hairs sometimes present; leaves chiefly elliptical, rarely ovate, the upper surfaces usually scabrous . . . . . 8. A. asperifolia

LL. Shrubs; stems usually angled, purple, dull, whitish arachnose-tomentulose hairs above; leaves chiefly oblong-ovate or ovate, the upper surfaces usually hispidulous, rarely glabrous . . . . . 11. A. sescenticeps

FF. Stems tomentose, tomentulose, hispidulous, pilosulous-villosulous or pilosulous above but if stems are subglabrous or glabrous above, the leaves are also subglabrous or glabrous on both surfaces; filiform

flowers only sporadically present in small numbers (if at all) on the staminate heads, the ligules of these corollas on both pistillate and staminate heads (unless not known) always short or essentially wanting, less than 0.8 mm long

M. Stems distinctly pubescent above, usually for some distance below the inflorescences, the hairs sometimes minute

N. Erect shrubs; stems thickly or sparsely tomentose or tomentulose above, the hairs sometimes shorter and harsher; hairs canescent, cinereous or sordid in color . . . . . 12. A. serratifolia

NN. Herbs and low spreading shrubs; stems pilosus-villosulous, sparsely or densely pilosulous or hispidulous

O. Stems hispidulous above, sometimes with sparse pilosulous hairs

P. Low spreading shrubs; stems white-hispidulous; upper and lower surfaces somewhat shiny, usually covered with white hirtellous and hispidulous hairs; pistillate heads homogamous with intermediate 5-lobed corollas; corollas on pistillate and staminate heads white becoming purple or rosy at maturity; Baja California Sur, Mexico . . . . . 13. A. peninsularis

PP. Herbs; stems hispidulous or sometimes with sparse pilosulous hairs, these usually sordid and the stiffer ones incurved; upper leaf surfaces somewhat dull, glabrous or with scattered pilosulous hairs near the margins and apices; pistillate heads heterogamous, the corollas white; achenes glabrous; Puebla and Vera Cruz, Mexico . . . . . 1. A. simplex

OO. Stems always with softer, sordid or brown pubescence above, pilosulous-villosulous or quite densely pilosulous

Q. Herbs; stems pilosulous-villosulous above; leaf blades elliptical-obovate or oblong-elliptical; lower leaf surfaces gray-green, dull; leaf apices short-acute or barely short-acuminate; Panama . . . . . 14. A. panamensis

QQ. Herbs(?); stems densely pilosulous above; leaf blades lance-ovate, lance-elliptic, merely ovate or elliptic; lower leaf surfaces light-green, dull; leaf apices long-acuminate; Costa Rica and Panama . . . . 15. A. irazuensis

MM. Stems essentially glabrous or glabrescent with some hispidulous and puberulous hairs on the branchlets and peduncles; leaves shiny and subglabrous or glabrous on both the upper and lower surfaces

R. Stems glabrescent above with some hispidulous and puberulous hairs on the branchlets and peduncles; leaves mostly oblong-ovate but sometimes elliptical, pergamentaceous; pappus bristles on the disk flower of the staminate heads irregular, composed of basally connate mixed groupings of regular barbellate bristles and ligulate papillose structures . . . . . 9. A. caloneura

RR. Stems essentially glabrous above as well as on the branches and peduncles; leaves narrowly lanceolate, thinly chartaceous; pappus bristles on all heads regular, barbellate . . . . . 10. A. androgyna

1. ARCHIBACCHARIS SIMPLEX Blake, Journ. Washington Acad. Sci. 17: 61. 1927. Hemibaccharis simplex Blake, Contr. U. S. Nat. Herb. 20: 547-548. pl. 49. 1927. Type: MEXICO: State of Puebla: woodlands around Honey Station, no ele. cited, 25 November 1903, Pringle 11821 (US!; photo. MIN! NY! UC!; isotypes: GH! MICH! MO! MSC! TEX! UC!).

Archibaccharis Schultzii Heer., Jahr. Hamb. Wissensch. Anst. 21: Beiheft 3: 40. 1904. nom. nud.

Erect or ascending ligneous herbs; ca. 3.7-6 dm tall; the bases procumbent, rhizomatous. Stems slender, angled especially near the decurrent leaf bases, the bases ca. 2.0 mm in diam., graduating to ca. 1.5 mm above, the internodes 5.0-25.0 mm long, dull, brown below becoming purple above, glabrescent below, hispidulous or with sparse pilosulous hairs above, the hairs usually sordid and the stiffer ones incurved, often with subtuberculate bases. Leaves with short petioles, 2.0-5.0 mm long, puberulous; blades oblanceolate, elliptic, oblong-elliptic or obovate, 4.5-8.0 cm long, 1.5-2.0 cm wide, thinly chartaceous or membranaceous, cuneate at bases, acute or short-acuminate at apices; margins distally serrulate or merely denticulate, the upper surfaces dark-green, dull, glabrous or with scattered pilosulous hairs near the margins and apices, the lower surfaces

lighter green, dull, glabrous or sparsely pubescent. Panicles corymbiform, the peduncles lax and pilosulous. Pistillate Heads: 6.0-8.5 mm high, ca. 3.5 mm wide, phyllaries 4-5 seriate, the outer triangular, lanceolate and glabrous, the inner linear-lanceolate and glabrous; filiform ray flowers 34-48, pappus 4.4-5.2 mm long, whitish or brown-tinged, corollas 3.3-4.0 mm long, white, the tubes puberulous, the ligules erect, 0.2-0.3 mm long, densely puberulous with antrorse hairs which exceed the apices, achenes 0.9-1.4 mm long, 2-3 nerved, shiny and glabrous; disk flowers 1-5, pappus 4.8-5.8 mm long, corollas 4.8-5.6 mm long, white, anthers sterile, achenes abortive, inane or reduced to small knobs; abnormal intermediate flowers are sometimes present. Staminate Heads: ca. 8.0 mm high, ca. 6.0 mm wide, phyllaries ca. 5-seriate; filiform ray flowers occurring sporadically, 0-2 or perhaps more, vestigial, much smaller but similar to the filiform flowers of the pistillate heads; disk flowers ca. 32, white, pappus 4.2-4.8 mm long, whitish or brown-tinged, tubes 2.0-2.2 mm long, sparsely puberulous, limb 3.0-3.6 mm long, puberulous, lobes triangular, 1.0-1.9 mm long, dorsally puberulous, style branches linear-lanceolate, acute or barely acuminate, achenes inane.

Pollen diameters (microns): polar, 20.5-24.4; equatorial, 22.7-27.2; Pringle 11821.

Floral illustrations: Fig. 3.

Known only from the states of Puebla and Vera Cruz, Mexico, 2600-3030 m ele., (Fig. 8). Honey Station is a village situated on moist woodlands on an area of former volcanic activity. Obsidian fragments are abundant along the roadways. Current maps show Honey Station just over the border in the state of Puebla rather than in Hidalgo as recorded by Pringle. My visit to Honey Station was by automobile in mid-January, 1969. Specimens of A. simplex were not located despite a search which included all the woodlands immediately surrounding the village and a short journey along the River San Marcos. C. G. Pringle's collection was made in the month of November, a fact which may help explain the author's failure. Certainly the habitat has undergone change since 1903. The clean pine stands were at least second growth as evidenced by the neatly planted rows.

The Pringle collection of A. simplex was originally distributed as Baccharis hieracifolia Hemsl., a species now known as A. hieraciifolia Heer. var. hieracioides. The two taxa are perhaps closely related but differ particularly in leaf characters and pubescence.

The range of A. simplex may now be extended to the state of Vera Cruz. As represented in the Paris and Copenhagen Herbaria, Liebmann 425 belongs to this species. Liebmann 425 in the Gray Herbarium is A. Schiedeana. Heering (1904, p. 41) had a Liebmann 425 before him for which he suggested the name "Archibaccharis Schultzii." Heering's brief reference to "leaves sessile or short-stemmed" and bare leaf surfaces indicates he probably was studying the plant later described by Blake as A. simplex. Because the name A. Schultzii was published without description or diagnosis, it has been treated here as a nomen nudum.

During my dissection of Pringle 11821, two vestigial filiform flowers with inane achenes were found on the margins of a staminate head. These flowers were smaller than those fertile flowers of the pistillate heads but were otherwise similar.

MEXICO: State of Vera Cruz: peak of Mt. Orizaba, Liebmann 425, in part (C, fragments P).

2. ARCHIBACCHARIS CAMPII Blake, Proc. Biol. Soc. Washington 55: 115-116. 1942. Type: MEXICO: State of Oaxaca: lower slopes Mt. Zempoaltepetl, 19-27 February 1937, Camp 2700 (NY!; photo. MIN!; photo. and fragments, US!).

Erect ligneous herbs(?); ca. 6 dm tall; subterranean parts and bases not seen. Stems obscurely fractiflex above, nearly terete or round-angled, 1.2-3.0 mm in diam. above, the internodes 1.0-3.0 cm long above, barely shiny, purple or brown, the hairs weak and scattered below but becoming densely pilosulous above with some hirtellous and glandular hairs. Leaves with petioles mostly wanting, sometimes 1.0-2.0 mm long, hirtellous-pilosulous; blades elliptic-oblong or lance-oblong, 6.0-11.0 cm long, 2.0-4.0 cm wide, thickly chartaceous, cuneate at bases, usually long-acuminate at apices but sometimes more abrupt, margins serrate or simply denticulate, the upper surfaces dark-green, dull, rather densely and evenly hirtellous with some pilosulous and hispidulous hairs, the lower surfaces lighter green, dull, sparsely hirtellous with some pilosulous hairs. Panicles convex, the peduncles with many stiff, glandular hairs mixed with hirtellous and pilosulous hairs. Pistillate Heads: 7.0-8.0 mm high, 3.0-3.5 mm wide, phyllaries 5-6 seriate, acute or obtuse, the outer lance-ovate, sparsely puberulous with some short glandular hairs, the inner linear-lanceolate and similarly puberulous; filiform ray flowers ca. 38, pappus 5.2-5.8 mm long, white, corollas 3.5-5.4 mm long, white, sparsely puberulous, the hairs denser near the apices, the ligules erect if present, ca. 0.6 mm long, achenes 1.5-1.8 mm long, 2-3 nerved, somewhat shiny and hispidulous; disk flowers 2-4, pappus 4.6-5.8 mm long, corollas 5.4-5.9 mm long, white, anthers sterile, achenes abortive, inane or reduced to small knobs. Staminate Heads: 7.5 mm high, ca. 8.0 mm wide; phyllaries 5-6 seriate; disk flowers ca. 42, white, pappus 4.3-4.6 mm long, white, tubes 2.2-2.5 mm long, sparsely puberulous, limb 2.6-3.4 mm long, puberulous below, lobes oblong, 1.6-1.9 mm long, sparsely puberulous near the apices of the dorsal surfaces, style branches linear, acuminate or perhaps attenuate, achenes abortive, reduced to small knobs.

Pollen diameters (microns): polar, 19.4-24.4; equatorial, 23.3-27.8; Camp 2685.

Floral illustrations: Fig. 3.

Known only from the type locality in Mexico (Fig. 8). Mt. Zempoaltepetl is 3200 m at the top and is the highest mountain in the state of Oaxaca. Detailed information relative to the data on Camp's collection labels has been provided by Blake (1942). Camp's labels read "top, middle to upper and lower slopes" of Mt. Zempoaltepetl. "Top" indicated the last few hundred feet below

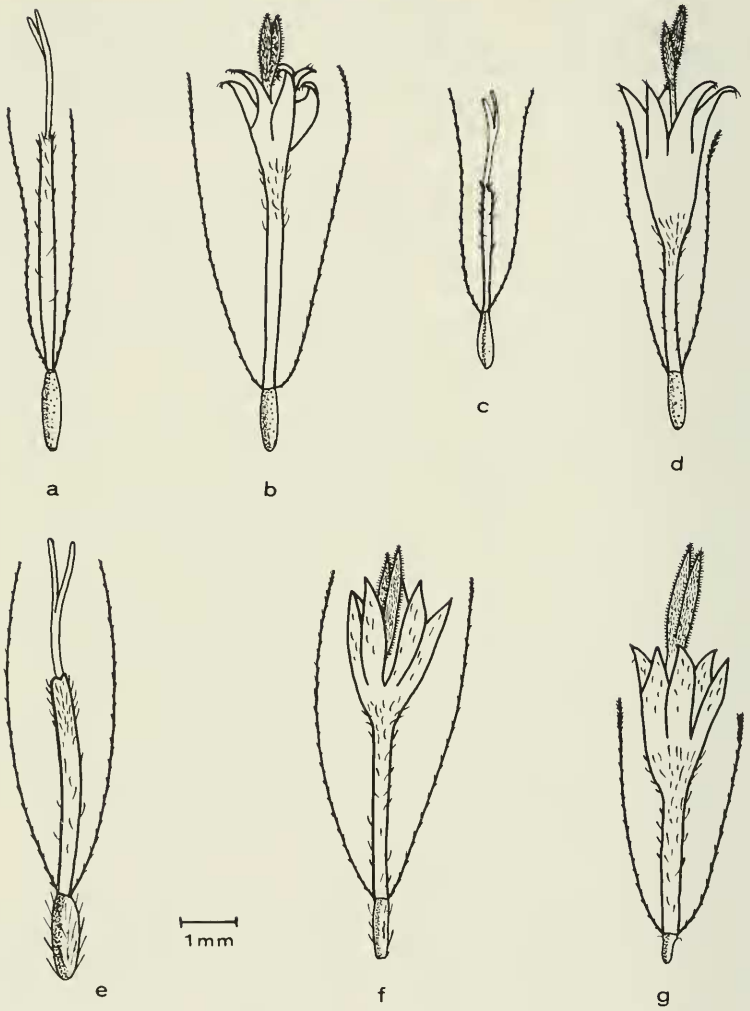


Fig. 3. Floral illustrations of Archibaccharis simplex and A. campii. A. simplex (all from Pringle 11821): (a, b) pistillate heads: (a) filiform flower, (b) disk flower; (c, d) staminate heads: (c) filiform flower, (d) disk flower. A. campii: (e, f) pistillate heads (Camp 2700): (e) filiform flower, (f) disk flower; staminate heads: (g) disk flower (Camp 2685). Disk flowers are shown without anthers.

the summit while "upper slopes" described the region 500-1000 feet below the summit and "middle" meant the region that extended several thousand feet below the upper regions. The staminate specimen of A. campii was collected on the middle slopes and the pistillate specimen on the lower slopes.

The characteristics of this inadequately known species suggest that it is closely related to A. hieraciifolia var. hieracioides. They differ in petiole length, pubescence and phyllary morphology. The plant probably has a herbaceous stem although this has yet to be verified. More material is needed for study.

MEXICO: State of Oaxaca: middle slopes, Mt. Zempoaltepetl, Camp 2685 (NY, photo., US).

3. ARCHIBACCHARIS HIERACIIFOLIA Heer. var. HIERACIIFOLIA.

Archibaccharis hieraciifolia Heer., Jahr. Hamb. Wissensch. Anst. 21: Beiheft 3: 40. 1904 (prim.). Type: MEXICO: State of Oaxaca: Sierra de San Felipe, ele. 2966 m, 13 Dec. 1895, Pringle 6257 (HBG; photo. MIN!; isotypes: BM! F! GH! K! MIN! MO! MSC! NY! P! UC! US!).

Baccharis oaxacana Greenm., Proc. Amer. Acad. 40: 37. 1904. Hemibaccharis oaxacana (Greenm.) Blake, Contr. U. S. Nat. Herb. 20: 546. 1924. Archibaccharis oaxacana (Greenm.) Blake, ibid. 23: 1508. 1926. Type: Pringle 6257.

Erect ligneous herbs; ca. 3-11 dm tall; glandular pubescent; the bases often procumbent, rhizomatous. Stems essentially straight but sometimes fractiflex, terete or angled near the decurrent bases of the petioles, the bases 2.0-5.0 mm in diam., graduating to 1.0-4.0 mm above, the internodes 0.8-6.5 cm long, dull or shiny, brown, red-brown, green or purple, glabrescent or densely whitish pilosulous below, densely glandular-pubescent above. Leaves sessile; blades narrowing abruptly or sometimes gradually towards the bases below the middle, elliptic, oblanceolate, ovate or obovate, 5.0-13.5 cm long, 2.0-4.5 cm wide, chartaceous, always auriculate-amplexicaul at bases with the obtuse auricles sometimes wider than the linear or tapered petioliform portions which are 2.0-9.0 mm wide, the older cauline leaves usually abruptly acute, subobtuse, barely acuminate or acute at apices, margins distally serrate, serrulate or merely denticulate, the upper surfaces dark-green, dull, glandular-pubescent, the lower surfaces lighter green, glandular-pubescent with the shorter, erect glandular hairs often obscured by pilosulous-villosulous hairs or sometimes subglabrous. Panicles corymbiform or cymose on glandular-pubescent peduncles. Pistillate Heads: 7.0-9.0 mm high, 4.0-5.0 mm wide, phyllaries 5-6 seriate, long-acuminate, the outer subulate or perhaps lance-ovate and glandular-pubescent, the inner linear-lanceolate and glabrous; filiform ray flowers 59-73, pappus 5.3-6.6 mm long, white, corollas 3.4-6.6 mm long, white or green-white, puberulous above, the ligules erect, 0.2-0.3 mm long, glabrous or puberulous near the bases, achenes 1.0-1.4 mm long, 2-nerved, shiny and hispidulous; disk flowers 2-11, pappus 5.6-6.8 mm long, corollas 5.4-7.0 mm long, white or green-white, anthers sterile, achenes abortive, inane or reduced to small knobs.

Staminate Heads: 8.0-9.0 mm high, 5.0-6.0 mm wide, phyllaries 4-5 seriate; filiform ray flowers occurring sporadically, 0-12 or perhaps more, pappus ca. 6.4 mm long, corollas ca. 3.8 mm long, white or green-white, achenes perhaps fertile; disk flowers ca. 72, white or green-white, pappus 4.6-6.8 mm long, white, tubes 2.1-3.5 mm long, sparsely puberulous, limb 2.3-4.5 mm long, puberulous, lobes oblong, 1.0-2.2 mm long, puberulous, style branches linear-lanceolate, barely acuminate or narrowly acute, achenes abortive, inane or reduced to small knobs.

Chromosome number: n = 9 (Jackson, 1969), Fig. 1.

Pollen diameters (microns): polar, 23.3-28.3; equatorial, 25.5-31.0; Jackson 1030, Pringle 6257.

Floral illustrations: Fig. 4.

Blake (1927) did not recognize A. hieraciifolia Heer. as valid because Heering "gave no diagnosis." However, Heering explicitly compared differences of his species with Baccharis hieraciifolia Hemsl., thus providing the diagnosis required by Art. 32 of the International Code (Stafleu & Voss, 1972, p. 37). Heering's publication of this name is here regarded as valid.

Archibaccharis oaxacana (based on Baccharis oaxacana Greenm.) and A. hieraciifolia are competing names. Both names were applied to plants from the same collection, Pringle 6257, and were published in the same year, 1904. Personal correspondence in 1973 with Dr. J. A. Leussink of the International Bureau for Plant Taxonomy and Nomenclature, Utrecht, Netherlands, has confirmed that Heering's paper preceded the publication of Baccharis oaxacana Greenm. in 1904. My study of type photos of A. hieraciifolia Heer. (furnished by the Hamburg Herbarium) and the type of B. oaxacana Greenm. show that these plants are members of the same taxon. The correspondence and photos have been deposited with the type collections at the University of Minnesota Herbarium.

A. hieraciifolia var. hieracioides and A. hieraciifolia var. glandulosa are closely related to the present variety. The way in which the leaf blade is abruptly contracted to a petioliform portion is often a distinctive mark for var. hieraciifolia. However, the leaves of Jackson 1029, taken from a clone of pistillate plants growing in open sun do not show this characteristic. A comparison of that collection with Jackson 1030 which was collected directly across the road will demonstrate considerable phenotypic plasticity. The plants from Jackson 1030 were found growing in shade conditions. The number of florets on the pistillate heads may perhaps be used to separate var. hieraciifolia from var. glandulosa. The phyllaries in var. hieraciifolia seem less glandular-pubescent than the other two varieties and their apices are not as noticeably lax.

Abnormal intermediate flowers are sometimes found on the pistillate heads of this variety. Filiform ray flowers may often occur on the margins of the staminate heads.

Camp 2680 (NY) from Zempoaltepetl, Oaxaca, may represent a form of the present variety. The giant features of this plant suggest that it may be polyploid. The staminate heads and flowers are extremely large as are the trichomes.

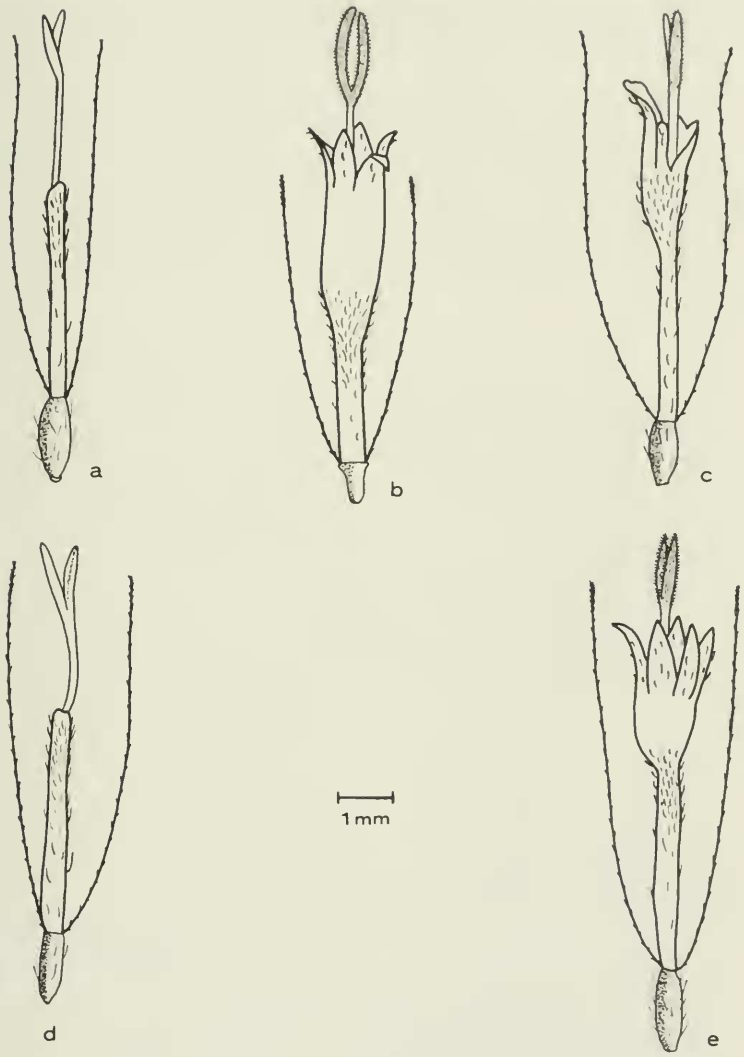


Fig. 4. Floral illustrations of Archibaccharis hieraciifolia var. hieraciifolia (all from Jackson 1030). Pistillate heads: (a) filiform flower, (b) disk flower, (c) abnormal intermediate flower; staminate heads: (d) filiform flower, (e) disk flower. Disk flowers are shown without anthers.

This variety of A. hieraciifolia is known from the state of Oaxaca, Mexico (Fig. 8). The habitat has been described as on shaded slopes and sometimes in more open exposures at 2000-2966 m ele.

MEXICO: State of Oaxaca: 10 miles northeast of Ixtlán de Juarez along road to Tuxtepec, Breedlove 8034 (DS, F, MICH); Cerro de San Felipe, north of Oaxaca (top), Camp 2596 (NY); 11.2 miles north of Ixtlán de Juarez on the road to Tuxtepec, Jackson 1029 (B, BM, C, DS, F, G, GH, K, MICH, MIN, MO, MSC, NY, P, POM, TEX, UC, US, WIS); directly across the road from the preceding collection, Jackson 1030 (B, BM, C, DS, F, G, GH, K, MICH, MIN, MO, MSC, NY, P, TEX, UC, US, WIS); Sierra de San Felipe, Pringle 5669 (GH).

3a. ARCHIBACCHARIS HIERACIIFOLIA Heer. var. HIERACIODES (Blake) J. D. Jackson, Phytologia 28(3): 296-297. 1974. Baccharis hieraciifolia Hemsl. Biol. Centr. Amer. 2: 129. 1881. Not. Lam. 1783. Hemibaccharis hieracioides Blake, Contr. U. S. Nat. Herb. 20: 547. 1924. Archibaccharis hieracioides Blake, Journ. Washington Acad. Sci. 17: 60-61. 1927. Lectotype: MEXICO: State of Mexico: Desierto Viejo, Valley of Mexico, 3 November 1865 or 1866, Bourgeau 1230 (K! photo. MIN!; isolectotypes: C! GH! P! US! photo. of C isolectotype, GH! NY! TEX! photo. and fragments from an undetermined herbarium, MSC!).

Erect ligneous herbs; ca. 2.5-20 dm tall; glandular-pubescent; the bases often procumbent, rhizomatous. Stems straight or obscurely fractiflex, terete or sometimes angled near the decurrent bases of the petioles, the bases 1.5-5.0 mm in diam., graduating to 1.0-3.0 mm above, the internodes 1.0-4.0 cm long, dull or shiny, purple, brown-purple, green, brown-green or brown, glabrescent below then sparsely pilosulous or glandular-pubescent becoming thickly glandular-pubescent above with mostly glandular hairs. Leaves with variable petioles, 2.0-20.0 mm long and naked or often with narrow, quite obscure, decurrent green margins which may or may not continue to the junction of the stems and leaves, glandular-pubescent; blades variable, lanceolate, linear-lanceolate, elliptic, oblong-elliptic, lance-ovate or ovate, 3.0-18.0 cm long, (1.0-)2.0-4.0 cm wide, chartaceous or thinner, cuneate at bases but sometimes continuing decurrently to the stem with a narrow petioliform portion which varies in width from obscure to 7.0-8.0 mm wide, the sessile leaves then obtuse at the stems or with an auriculate-amplexicaul extension, acuminate at apices, or especially older cauline leaves, rarely acute, margins distally serrate, serrulate, merely denticulate or rarely entire, the upper surfaces dark-green, dull, glandular pubescent, the lower surfaces noticeably lighter green, glandular-pubescent, the density of hairs varying, the shorter glandular hairs often obscured by pilosulous and villosulous hairs. Panicles loose and often corymbiform on glandular-pubescent peduncles. Pistillate Heads: 8.0-15.0 mm high, 5.0-8.0 mm wide, phyllaries 4-5 seriate, long-acuminate and lax, the outer subulate, glandular-pubescent, the inner linear-

lanceolate and becoming glabrous; filiform ray flowers (17-)56-99, pappus 5.2-7.4 mm long, white, corollas 5.0-7.0 mm long, white or green-white, puberulous above, the ligules erect, 0.2-1.6 mm long and puberulous, achenes 1.4-2.6 mm long, 2-3 nerved, shiny and hispidulous; abnormal intermediate flowers are sometimes present; disk flowers 2-9(-22), pappus 5.5-7.8 mm long, corollas 6.1-8.6 mm long, white or green-white, anthers sterile, achenes inane, apparently sometimes fertile or reduced to small knobs. Staminate Heads: 8.0-10.0 mm high, 5.0-8.0 mm wide, phyllaries 4-5 seriate; filiform ray flowers occurring sporadically 0-4(-29), pappus 3.0-6.0 mm long, white, corollas sometimes greatly reduced or nearly normal, 1.0-5.5 mm long, white or green-white, achenes abortive, inane and somewhat reduced in size or apparently sometimes fertile; disk flowers 40-67, white or green-white, pappus 4.0-7.0 mm long, white, tubes 1.9-3.8 mm long, puberulous above, limb 3.5-5.3 mm long, puberulous, lobes oblong, 1.6-2.4 mm long, puberulous on both surfaces, style branches linear-lanceolate, barely acuminate or narrowly acute, achenes abortive, inane or reduced to small knobs.

Chromosome number: n = 9 (Jackson, 1969), Fig. 1.

Pollen diameters (microns): polar, 21.2-28.9; equatorial, 25.5-30.0; Jackson 1050, Lyonnet 400.

Floral illustrations: Fig. 5 & 6.

Because of the great morphological similarities of A. hieracioides, A. oaxacana and A. glandulosa, the three species have been reduced to varietal level. The three taxa have similar flowers, overlapping floral measurements and identical pubescence. Blake (1924, p. 546) in discussing A. hieracioides and A. glandulosa, felt that "the two species may perhaps be identical but are best kept distinct until further evidence is available." var. hieracioides may be distinguished by its acuminate leaf apices. The author's field investigations revealed that the leaves of var. hieracioides may have naked petioles or possess a narrow green petioliform portion varying from scarcely noticeable to 7.0-8.0 mm wide, including the midrib. In addition, clasping leaf bases are sometimes found as in var. glandulosa and var. hieraciifolia. Suggestions of such leaf bases are common. The three taxa are now varieties of A. hieraciifolia, cf. discussion of A. hieraciifolia.

Pringle 7709 (US) and Bourgeau 1230 (US) which were cited by Blake (1924, p. 546) as A. glandulosa have been cited in this paper as var. hieracioides. Pringle 7709 (US) was subjected to the cotton blue test. The results showed 85.4% viable pollen. It does not seem that this specimen represents a hybrid between var. hieracioides and var. glandulosa. The three varieties are perhaps not completely genetically isolated.

Hemsley (1881, p. 129) cited two Bourgeau collections, 951 and 1230 as the types of his Baccharis hieraciifolia. In accordance with Chapter II, Sec. 2, Art. 7, Note 1 of the Code (Stafleu & Voss, 1972) Bourgeau 1230 has been selected to serve as the lectotype. In fact, Bourgeau 951 was collected in the Forest of San Nicolas, Valley of Mexico, while Bourgeau 1230 was collected

at Desierto Viejo, Valley of Mexico. Both collections belong to the present variety.

Before Blake transferred all the species he had published under his genus Hemibaccharis (1924, p. 547) to Archibaccharis, he applied a new name to Hemsley's species when he published it as Hemibaccharis hieracioides. The epithet "hieraciifolia" had been used by Lamarck as Baccharis hieraciifolia Lam. 1783. Blake regarded Heering's Archibaccharis hieraciifolia as only a new combination and cited that name "as to synonym only." The present paper recognizes the validity of Heering's A. hieraciifolia.

This variety of A. hieraciifolia sometimes shows filiform pistillate corollas on the edges of the staminate heads. The achenes of these flowers are apparently sometimes fertile as are the achenes of the disk flowers found in the centers of the pistillate heads. It was not uncommon to find abnormal intermediate flowers on the pistillate heads. Even entire heads were found to be abnormally intermediate, composed completely of abnormal flowers. Rzedowski 19442 (TEX) and Purpus 1498 (MO) exhibited such heads.

From Guerrero, Hidalgo, Jalisco, Michoacan, Morelos, San Luis Potosi and Tlaxcala, Mexico (Fig. 8). Moist, shady woods on often steep, rocky and dry slopes, 2185-3800 m ele.

MEXICO: Federal District: Desierto de los Leones, Jackson 1045 (B, BM, C, DS, F, G, GH, K, MICH, MIN, MO, MSC, NY, P, POM, TEX, UC, US, WIS); Desierto de los Leones, Lyonnet 400 (BM, GH, K, MO, NY, US); Desierto de los Leones, Lyonnet 3026 (US); Desierto do los Leones, Rzedowski 15572 (MICH); Desierto de los Leones, Steyermark 52254 (F). State of Guerrero: Teotepec, Hinton 11124 (K, MICH, NY); Cerro Teotepec, Municipio of Talacotepec, Rzedowski 18138 (MICH, MSC, WIS). State of Hidalgo: Cerro de las Ventanas, 6 km north of Pachuca, Rzedowski 18199 (MICH, MSC, TEX, WIS); Cerro de los Gavilanes, east of Estanzuela, Municipio of El Chico, Rzedowski 22027 (MICH, MSC); State of Jalisco: northern slopes of Nevado de Colima, above the sawmill called Piedra Ancha and just east of the first great canyon west of the sawmill site, McVaugh 11611 (MICH); northeastern slopes of Nevado de Colima, below Canoa de Leoncito, at head of Barranca de la Rosa, McVaugh 13400 (MICH). State of Mexico: Mesón Viejo, Hinton 3271 (F, GH, K, MICH, MO, US); slope west of Ixtaccihuatl, 6 km east of San Rafael, Municipio of Tlalmanalco, Holguín 210649 (MSC); Mt. Ixtaccihuatl, Jackson 1050 (F, GH, K, MIN, NY, P, US); Sierra de las Cruces, Pringle 7709 (F, P, POM, US); Mt. Ixtaccihuatl, Purpus 251 (GH, MO, POM, UC, US); Mt. Ixtaccihuatl, Purpus 1498 (1948?) (A, BM, C, GH, DS, NY, P, POM, UC, US); moist barranca 3 km east of San Rafael, Rzedowski 19329 (MICH); slope west of Ixtaccihuatl, 5 km east of San Rafael, Municipio of Tlalmanalco, Rzedowski 25444 (MICH, MSC). State of Michoacan: wooded slopes 8-10 miles northwest and west-northwest of Ciudad Hidalgo, among mountains west of Cerro San Andrés and 6-7 miles north of village of San Pedro Aguaro, McVaugh 9891 (BM, G, GH, MICH, NY, TEX). State of Morelos: Lagunas de Zempoala, Lyonnet 3203 (US). State of San Luis Potosi: San Luis Potosi, d'Aoust 262 (P). State of Tlaxcala: north of

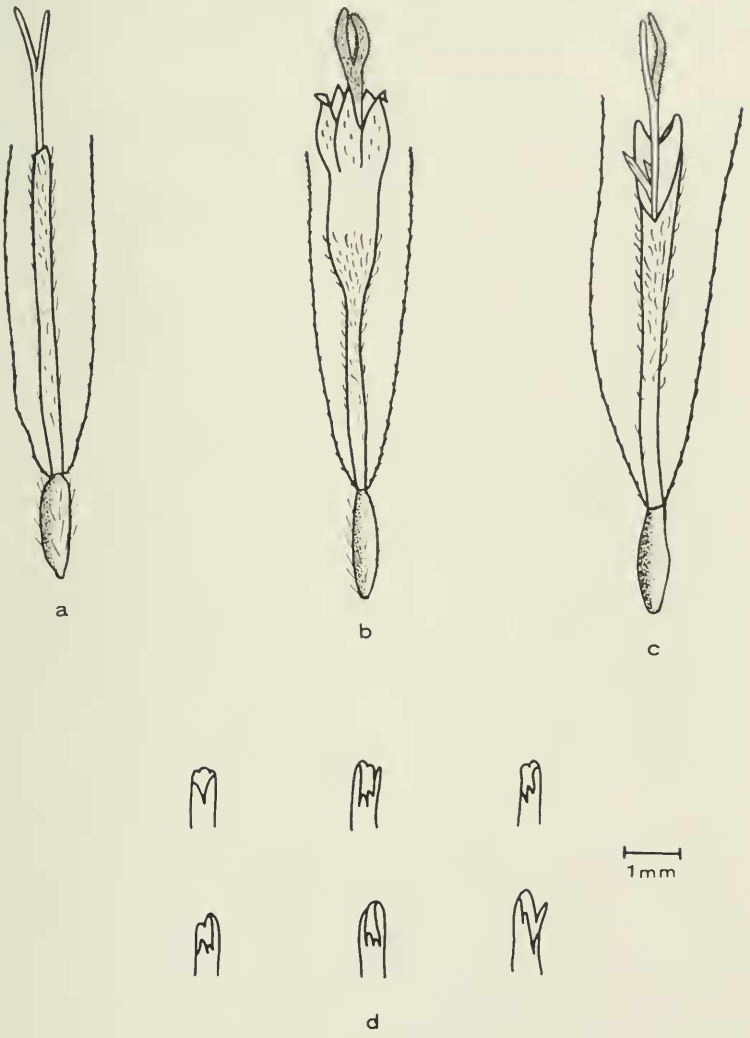


Fig. 5. Floral illustrations from the pistillate heads of Archibaccharis hieraciifolia var. hieracioides. (a) filiform flower (Jackson 1045); (b) disk flower (Jackson 1045); (c) abnormal intermediate flower (Rzedowski 18138); (d) apices of abnormal intermediate flowers (Purpus 1498). Disk flowers are shown without anthers.

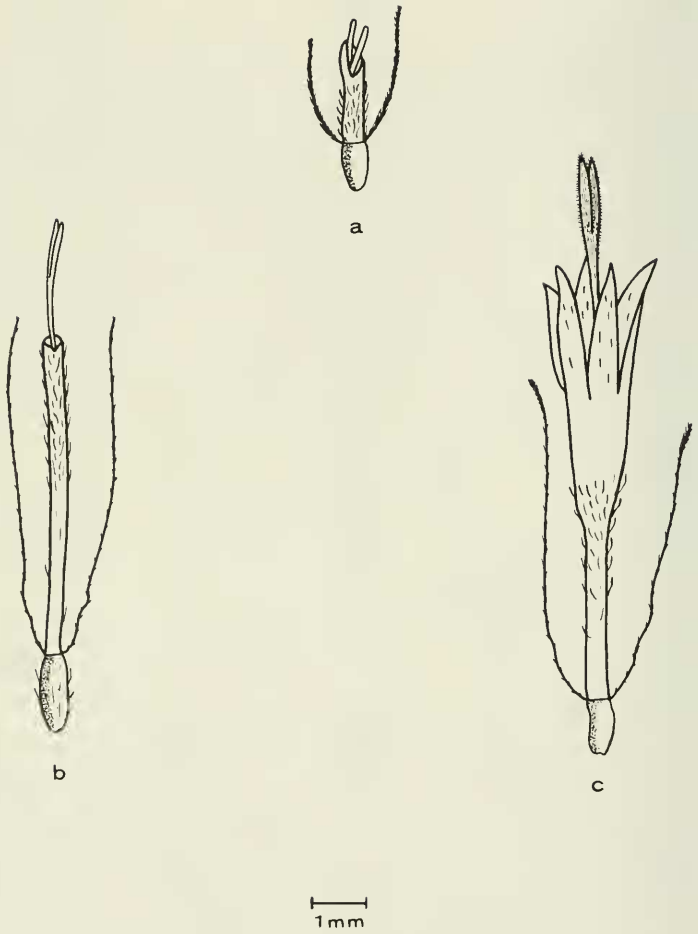


Fig. 6. Floral illustrations from the staminate heads of Archibaccharis hieraciifolia var. hieracioides (all from Jackson 1045). (a) abnormal, reduced filiform flower, (b) filiform flower, (c) disk flower. Disk flowers are shown without anthers.

Cerro La Malinche, 7 km southwest of Rancho de Jesús, Municipio Huamantla, Rzedowski 23794 (MICH, MSC).

3b. ARCHIBACCHARIS HIERACIIFOLIA Heer. var. GLANDULOSA (Greenm.) J. D. Jackson, Phytologia 28(3): 296. 1974. Baccharis glandulosa Greenm., Proc. Amer. Acad. 40: 36-37. 1904. Hemibaccharis glandulosa (Greenm.) Blake, Contr. U. S. Nat. Herb. 20: 546. 1924. Archibaccharis glandulosa (Greenm.) Blake, Journ. Washington Acad. Sci. 17: 60. 1927. Type: MEXICO: Federal District: Serrania de Ajusco, 2895 m ele., 7 December 1903, Pringle 8782 (GH!); isotypes: BM! CI! F! K! MICH! MIN! MO! NY! P! POM! UC! US!).

Erect ligneous herbs; ca. 4-5 dm tall; glandular-pubescent; the bases often procumbent, rhizomatous. Stems essentially straight but sometimes fractiflex, terete or sometimes angled near the decurrent bases of the petioles, the bases 2.0-3.5 mm in diam., graduating to 1.0-3.0 mm above, the internodes 0.5-4.0 cm long, somewhat shiny below, rather dull above, brown, red-brown, green or purple, glabrescent below, thickly glandular-pubescent above. Leaves sessile; blades usually narrowing very slightly towards the bases appearing nearly linear throughout or with some of the leaves narrowing more abruptly just below the middle forming a nearly linear or tapering petioliform portion much wider than the widest part of the blades, linear-lanceolate or sometimes elliptic, oblong-elliptic or ovate, 3.5-9.0 cm long, 1.0-2.0 cm wide, thickly chartaceous, always auriculate-amplexicaul at bases with the usually broad, obtuse auricles often wider than the petioliform portions which are 3.0-12.0 mm wide, the older cauline leaves usually abruptly acute or rarely longer and barely acuminate or acute at apices, margins distally serrate, serrulate or merely denticulate, the upper surfaces dark-green or nearly all dark-purple, dull, glandular-pubescent, the lower surfaces lighter green, glandular-pubescent with the shorter, erect glandular hairs often obscured by pilosulous or villosulous hairs or sometimes subglabrous. Panicles corymbiform or cymose on glandular-pubescent peduncles. Pistillate Heads: 7.0-10.0 mm high, 4.0-7.0 mm wide, phyllaries 4-5 seriate, long-acuminate, the outer subulate or barely linear-lanceolate and glandular-pubescent, the inner linear-lanceolate and becoming glabrous; filiform ray flowers 100-127, pappus 5.7-6.6 mm long, white, corollas 3.6-6.1 mm long, white or green-white, puberulous above, the ligules erect, 0.3-0.9 mm long or often obscure, puberulous only near the bases, achenes 1.0-1.6 mm long, 2-nerved, shiny and hispidulous; disk flowers 3-15, pappus 4.7-6.4 mm long, corollas 5.2-7.0 mm long, white or green-white, anthers sterile, achenes abortive, inane or reduced to small knobs. Staminate Heads: 7.0-10.0 mm high, 5.5-8.0 mm wide, phyllaries 4-5 seriate; filiform ray flowers occurring sporadically, 0-3 or perhaps more, pappus 4.7-6.9 mm long, corollas 5.0-5.6 mm long, white or green-white, achenes perhaps fertile; disk flowers 38-93, white or green-white, pappus 4.4-6.1 mm long, white, tubes 2.0-3.6 mm long, puberulous above, limb 3.0-4.7 mm long, puberulous,

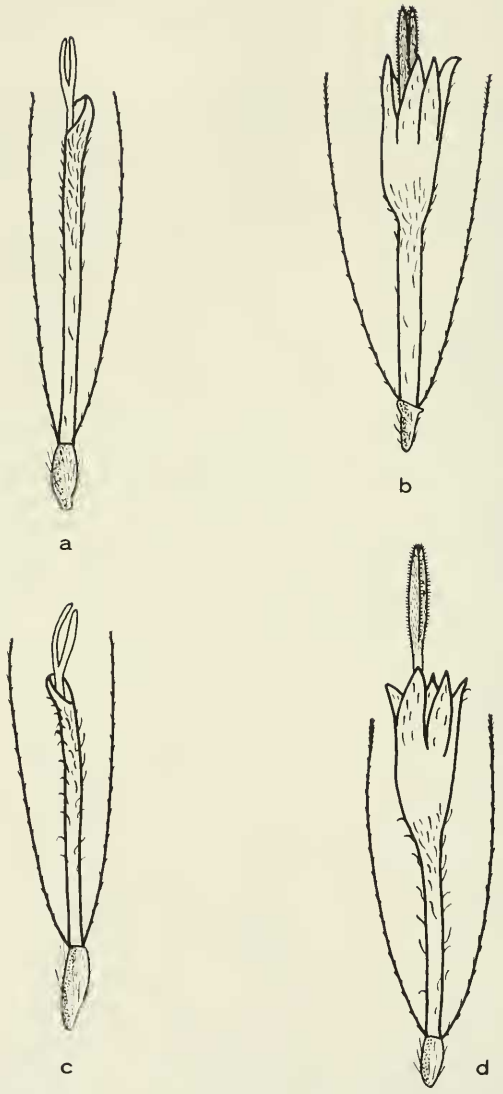


Fig. 7. Floral illustrations of Archibaccharis hieraciifolia var. glandulosa (all from Pringle 8782). Pistillate heads: (a) filiform flower, (b) disk flower; staminate heads: (c) filiform flower, (d) disk flower. Disk flowers are shown without anthers.

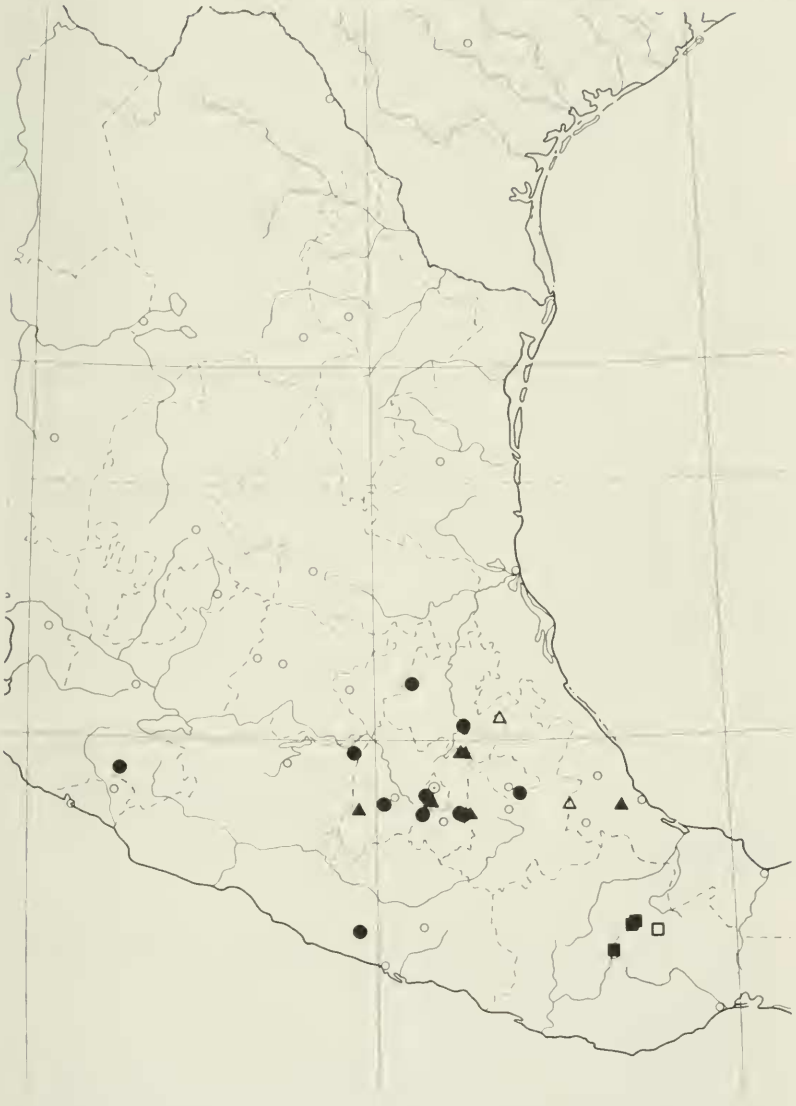

Fig. 8. Distribution of species and varieties of Archibaccharis in Mexico. Open squares, A. campii. Filled triangle, A. hieraciifolia var. glandulosa. Circle, A. hieraciifolia var. var. hieracioides. Filled square, A. hieraciifolia var. hieraciifolia. Open triangle, A. simplex.

lobes oblong, 1.6-2.2 mm long, puberulous on both surfaces, style branches linear-lanceolate, barely acuminate or narrowly acute, achenes abortive, inane or reduced to small knobs.

Pollen diameters (microns): polar, 23.3-27.8; equatorial, 23.9-30.0; Pringle 8782, Rzedowski 22020.

Floral illustrations: Fig. 7.

Archibaccharis hieraciifolia var. glandulosa is morphologically very similar to two other varieties, var. hieracioides and var. hieraciifolia. The present variety is perhaps best distinguished by its usually thicker leaves, linear-lanceolate leaf shape and a greater number of florets on the pistillate heads. The Puebla collection, Purpus 2792, possessed lower cauline leaves similar to those usually associated with var. hieraciifolia.

Blake (1927, p. 60) erred in his reference to Pringle 6257, indicating it was the type number of Baccharis glandulosa Greenm. That number is the type of A. hieraciifolia Heer.

Two collections cited by Blake (1924, p. 546) as A. glandulosa have been cited in this paper as var. hieracioides since the discovery that this taxon can also sometimes possess auriculate-amplexicaul leaf bases and acuminate leaf apices. Pringle 7709 (US) and Bourgeau 1230 (US) possess such characters. New collections are needed, particularly of var. hieraciifolia and var. glandulosa.

Iltis & Iltis 1660a from Cerro Gordo, D. F., looked like var. glandulosa except for slightly acuminate leaf apices. This may provide cause to suspect introgression.

From Federal District, Guerrero, Mexico and Puebla (Fig. 8). Growing in shade and on damp, steep slopes, rocky cliffs or volcanic ash, 2812-3200 m ele.

MEXICO: State of Guerrero: Petlacala, District Mina, Hinton 15405 (GH, US). State of Mexico: Crucero de Agua Blanca, Hinton 8823 (F, GH, K, MICH, MO, US); Mt. Ixtaccihuatl, Purpus 296 (MO); slope north of Cerro Gordo, around San Martín de las Pirámides, Rzedowski 22020 (MICH, MSC, WIS). State of Puebla: Boca del Monte, Purpus 2792 (BM, F, GH, MO, NY, UC, US).

4. ARCHIBACCHARIS SUBSESSILIS Blake, Brittonia 2: 339-340. 1937.

Type: GUATEMALA: Dept. Quiche: on bushy slope, Nebaj, 1920 m ele., 20 November 1934, Skutch 1736 (A! photo. MIN!; isotypes: BM! F! NY! US!).

Erect shrubs; ca. 5-29 dm tall; rhizomatous. Stems straight below, straight or obscurely fractiflex above, terete, the bases 1.5-7.0 mm in diam., graduating to 1.5-5.0 mm above, the internodes 0.5-4.5 cm long, somewhat shiny, brown, yellow-brown, red-brown, greenish, whitish or purple, glabrescent below, thickly puberulous above, the weak brown and white or purple hairs often nearly erect and mixed with superficial amber glands. Leaves with short petioles, 1.5-3.5(-4.0) mm long, puberulous; blades ovate, oblong-ovate, elliptical, oblong-elliptic or lanceolate, 3.0-10.0 cm long, 2.0-5.0 cm wide, firmly chartaceous, usually shallowly cordate at bases, rarely rounded, long or short-

acuminate at apices, margins distally serrulate or serrate, the upper surfaces dark-green or olive-green, dull, hispidulous and often with scattered or dense superficial amber glands, the lower surfaces lighter green, dull, sparsely hispidulous or subglabrous, often with scattered or dense superficial amber glands, the hairs denser than those on the upper surfaces. Panicles convex on densely puberulous peduncles, the hairs mixed with some superficial amber glands. Pistillate Heads: 4.0-6.0(-8.0) mm high, 2.5-3.2 mm wide, phyllaries 4-5 seriate, acute or acuminate, the outer triangular or oblong-lanceolate and somewhat puberulous, these hairs mixed with superficial amber glands, the inner becoming linear-lanceolate and glabrous; filiform ray flowers 17-29, pappus 3.1-4.3 mm long, white, corollas 3.2-4.2 (-4.8) mm long, white, green-white or sometimes purple, puberulous above, the ligules erect or obliquely reflexed, 1.2-2.2 mm long, achenes 0.8-1.7 mm long, (2-)3(-4) nerved, shiny and hirtellous with superficial whitish or light-amber glands; disk flowers 1-7, pappus 3.0-4.2 mm long, corollas 3.3-4.4(-4.8) mm long, white, green-white or sometimes purple, anthers sterile, achenes inane. Staminate Heads: 4.0-5.5(-6.0) mm high, 3.0-4.0 mm wide, phyllaries 4-5 seriate; filiform ray flowers 4-14, pappus 2.2-3.4 mm long, corollas 3.0-4.6 mm long, white, green-white or sometimes purple, achenes inane or apparently sometimes fertile; disk flowers 17-38, white, green-white or sometimes purple, pappus 2.5-3.5 mm long, white, tubes 1.1-1.9 mm long, puberulous above, limb 1.6-2.5 mm long, puberulous with rather blunt hairs, lobes triangular or oblong, 1.2-1.6 mm long, puberulous on the dorsal surfaces, style branches oblong, acute, achenes abortive, reduced to small knobs.

Chromosome number: n = 9 (Jackson, 1969), Fig. 1.

Pollen diameters (microns): polar, 16.7-19.0; equatorial, 19.0-23.3; Breedlove 8793, Jackson 1033.

Floral illustrations: Fig. 9.

The pistillate and staminate heads of A. subsessilis are always heterogamous. In that character and in the possession of well-developed ligules on the filiform corollas this species resembles A. corymbosa and A. linearilobis. Study revealed that despite the presence of ray and disk flowers on all heads, the species appears to be largely dioecious due to evolutionary loss. It is conceivable that the recognition of pistillate and staminate heads was long prevented because of the mixture of floral types on all heads. This generic character was not described by Blake (1924, pp. 544-545). The wider staminate heads appear to always possess a smaller number of filiform ray flowers (4-14) than the narrower pistillate heads (17-29). The achenes of the filiform ray flowers of the staminate heads are apparently rarely fertile. The staminate heads also have a greater number of disk flowers (17-38) than the pistillate heads (1-7). The anthers of the disk flowers are functional in the staminate heads but they are sterile in the disk flowers of the pistillate heads. The achenes of the disk flowers are abortive on both pistillate and

staminate heads. Thus, the loss of flowers, flower parts and functions strongly suggests evolution of dioecious plants with unisexual flowers from gynomonoecious plants.

Steyermark 36981 from Dept. San Marcos, Guatemala was reported by the collector as a sprawling vine. This was the only report of the scandent habit for this species. Otherwise, the characters of the plant correspond well to those of A. subsessilis. Steyermark's collection may have been of an abnormal growth form.

Heyde & Lux 3389 (GH, US), cited by Blake (1924, p. 548) as possibly being the staminate specimen of A. salmeoides, has been cited in this paper as A. subsessilis. Some representatives of that collection possessed the superficial amber leaf glands and floral characters typical of this species.

The exact position of Mt. Pasitar, Chiapas was not ascertained. Matuda collections of A. subsessilis, A. Schiedeana and A. serratifolia from that location were not shown on their respective distribution maps in this study.

From Chiapas, Mexico and Huehuetenango, Quiché and San Marcos, Guatemala (Fig. 10).

GUATEMALA: Dept. Huehuetenango: one mile north of Santa Eulalia along road to San Mateo Ixtatán, Breedlove 8576 (DS, F, MICH); 4 miles east of San Mateo Ixtatán on road to Barrillas, Breedlove 8763 (DS, F); 5 miles north of Santa Eulalia along road to San Mateo Ixtatán, Breedlove 8793 (DS, F); above Macx, between Todos Santos and San Martin, Steyermark 51897 (F). Dept. Quiché: San Miguel Uspantán, Heyde & Lux 3389 (F, G, GH, K, US). Dept. San Marcos: along quebrada Canjulá, between Sibinal and Canjulá, Volcán Tacaná, Steyermark 36046 (F); between Todos Santos and Finca El Porvenir, lower to middle slopes of Volcán Tajumulco, Steyermark 36981 (F); Puente de Nahuatl-aa, near San Marcos, Standley 66251 (F); slopes of Cerro Tumbador, about 15 km west of San Marcos, Williams, Molina & Williams 23055 (GH, NY); near Aldea Fraternidad, between San Rafael Pie de la Cuesta and Palo Gordo, west-facing slope of the Sierra Madre Mountains, Williams, Molina & Williams 25815 (F, G, NY). MEXICO: State of Chiapas: slope 5 miles north of Chamula Center along road to Chenalhó, Municipio of Chamula, Breedlove & Raven 8145 (F, MICH); 3.3 miles north of Chamula on the road to Chenalhó, Jackson 1033 (A, B, BM, C, DS, F, G, GH, K, MICH, MIN, MO, MSC, NY, P, POM, TEX, UC, US, WIS); Mt. Pasitar, Matuda S-35 (MICH); Mt. Ovando, Matuda S-50 (MICH); Mt. Pasitar, Matuda 0741 (MICH); Paraje Shahleh in Municipio of Tenejapa, Ton 562 (DS, MSC, NY, WIS); slope in the Paraje of Matsab, Municipio of Tenejapa, Ton 1965 (DS, MICH); slope in the Colonia 'Ach'lum, Municipio of Tenejapa, Ton 1995 (DS, MICH).

5. ARCHIBACCHARIS LINEARILOBIS J. D. Jackson, Phytologia 28(3): 300-302. Fig. 2. 1974. Type: GUATEMALA: Dept. Huehuetenango: steep, rocky slopes along road to San Juan Ixcoy, Sierra Cuchumantanes, 3700 m ele., 12-23 January 1966, Molina,

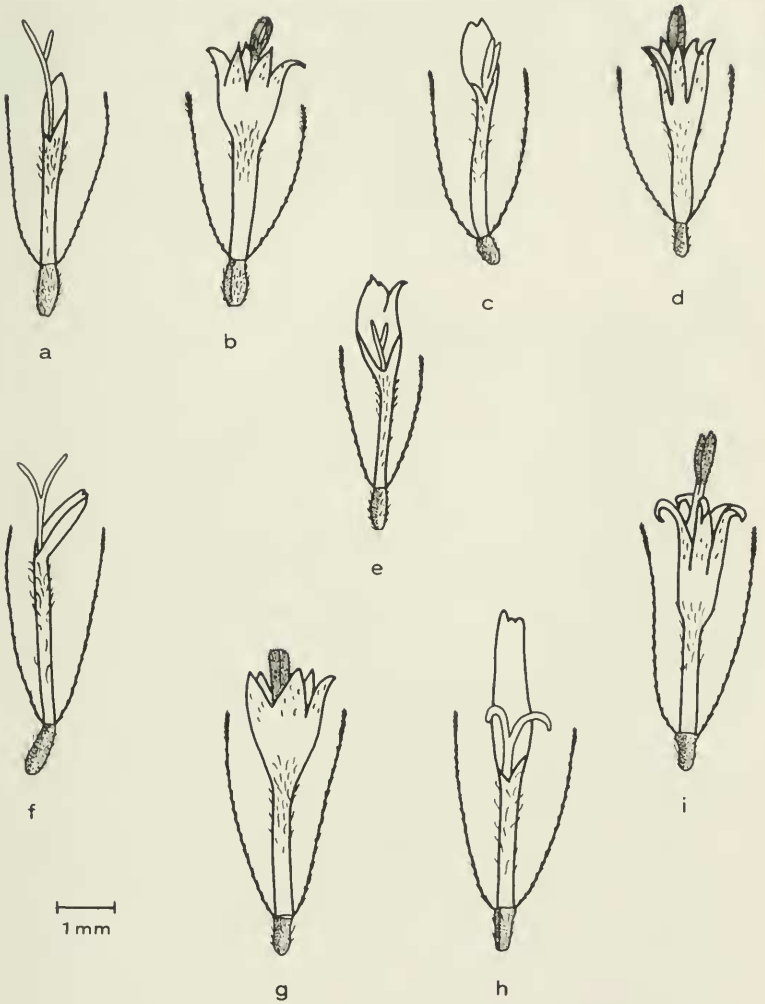


Fig. 9. Floral illustrations of Archibaccharis subsessilis and A. linearilobis. A. subsessilis (all from Jackson 1043): (a, b) pistillate heads: (a) filiform flower, (b) disk flower; (c, d, e) staminate heads: (c) filiform flower, (d) disk flower, (e) abnormal intermediate flower. A. linearilobis (all from Molina, Burger & Wallenta 16446: (f, g) pistillate heads: (f) filiform flower, (g) disk flower; (h, i) staminate heads: (h) filiform flower, (i) disk flower. Disk flowers are shown without anthers.

Fig. 10. Distribution of Archibaccharis subsessilis in Mexico and Guatemala.

Burger & Wallenta 16446 (F! photo. MIN!; isotype: NY!).

Known only from the type location (Fig. 12). Although reported as herbaceous, this species may be a woody shrub. Ca. 15 dm tall, densely glandular pubescent above; leaves ovate, oblong-ovate or elliptical, 3.5-6.0 cm long, 1.5-3.0 cm wide, short-acuminate at apices; panicles convex, the pistillate heads ca. 6.0 mm high, the staminate heads ca. 7.0 mm high.

Pollen diameters (microns): polar, 22.2-28.9; equatorial, 24.4-32.1; Molina, Burger & Wallenta 16446.

Floral illustrations: Fig. 9.

6. ARCHIBACCHARIS CORYMBOSA (Donn. Smith) Blake, Journ. Washington Acad. Sci. 17: 60. 1927. Diplostephium corymbosum Donn. Smith, Bot. Gaz. 23: 8. 1897. Hemibaccharis corymbosa (Donn. Smith) Blake, Contr. U. S. Nat. Herb. 20: 553. 1924. Type: GUATEMALA: Dept. Huehuetenango: Hacienda de Chancol, 3355 m ele., 2 January 1896, Nelson 3639 (US!; photo. MIN!; isotype: GH!).

Erect ligneous herbs; ca. 1.5-20 dm tall; pubescence soft and variable; rhizomatous. Stems straight below, obscurely fractiflex above, terete, the bases 1.5-4.0 mm in diam., graduating to 2.0-4.0(-4.5) mm above, the internodes 1.0-5.0 cm long, rather dull, tan, dark-brown, gray or grayish-purple, glabrescent below, villosulous above. Leaves with petioles (2-)11-15 mm long, hirtellous; blades oblong, elliptic or more rarely with linear or obovate shapes, 5.0-12.0 cm long, 1.0-4.0 cm wide, chartaceous but sometimes thickly so, cuneate at bases, less often obtuse, acuminate at apices, margins distally serrulate or serrate, the upper surfaces dark-green, dull, hirtellous, usually with superficial amber glands, the lower surfaces lighter green, dull, velutinous but with varying density, these hairs mixed with superficial amber glands. Panicles rather flat or rounded on villosulous peduncles. Pistillate Heads: 5.0-7.0 mm high, 2.5-4.0 mm wide, phyllaries 4-5 seriate, the centers green or red, acute or obtuse, sometimes acuminate, the outer subulate and densely villosulous, the inner linear-lanceolate and becoming glabrous; filiform ray flowers 27-34(-40), pappus 3.2-3.9 mm long, white below, bright red or pink near the apices, rarely yellow-tinged, corollas 3.8-5.2 mm long, of varying shades of pink to purple at maturity, sometimes white below but rarely entirely white, the ligules erect or obliquely reflexed, 1.6-2.8 mm long, achenes 0.9-1.4 mm long, 2-4 nerved but mostly trigonous, shiny and hispidulous, these hairs sometimes sparse and mixed with superficial amber glands; disk flowers 1-3(-4), pappus 3.2-3.9 mm long, corollas 3.4-4.2 mm long, of varying shades of pink to purple at maturity, rarely white, anthers sterile, achenes abortive, inane or reduced to small knobs. Staminate Heads: 5.0-8.0 mm high, 3.0-5.0 mm wide, phyllaries 3-4 seriate; filiform ray flowers 12-23, pappus 2.7-3.4 mm long, corollas 4.0-4.8 mm long, of varying shades of pink to purple at maturity, rarely white, achenes often full, perhaps fertile; disk flowers 29-38, of varying shades of pink to purple at maturity, rarely white,

pappus 3.0-3.7 mm long, white below, bright red or pink near the apices, rarely yellow-tinged, tubes 1.5-2.0 mm long, puberulous above, limb 1.9-2.4 mm long, sparsely puberulous, lobes oblong or merely acute, 1.0-1.2 mm long, sparsely puberulous on the dorsal surfaces, style branches oblong, abruptly acute or shortly acuminate, achenes abortive, reduced to small knobs.

Chromosome number: n = 9 (Jackson, 1969), Fig. 1.

Pollen diameters (microns): polar, 13.3-23.3; equatorial, 16.7-25.5; Jackson 1043, Williams, Molina & Williams 22998.

Floral illustrations: Fig. 11.

This species may now be retained in the genus Archibaccharis with more certainty. Blake (1924, p. 553) expressed some doubt as to his placement of this species in Archibaccharis due to the apparent lack of a staminate specimen. My examination of the type specimen, Nelson 3639 (US), indicated that the disk flowers of the heterogamous heads bore functional anthers and very probably was a functional staminate plant. As with A. subsessilis and A. linearilobis, the heads on both pistillate and staminate plants are always heterogamous, possessing both ray and disk flowers. These heads should probably be regarded as possessing more primitive characters than the taxa in which only the pistillate plant remains with heterogamous heads. The pattern of evolutionary loss in A. corymbosa parallels that found in the above mentioned species, cf. the discussion of A. subsessilis.

Williams, Molina & Williams 23158 from Cerro María Tecum, Dept. Totonicapán, was reported as having flowers white or reddish. All other collections examined had flowers of shades from pink to purple, apparently to purple at maturity.

During my examination of Jackson 1043 a form was found which possessed a long, rigid, black, often branched pubescence on the staminate heads. The style branches of both the filiform ray flowers and the disk flowers as well as the anther sacs of the disk flowers exhibited this character.

From Chimaltenango, Huehuetenango, Quezaltenango, San Marcos, Totonicapán and Sacatepéquez (Fig. 12). Collected in moist, mountainous forests and open, dry mountainsides, 2400-3700 m ele.

GUATEMALA: Dept. Chimaltenango: Santa Elena on Cerro de Tecpán, Jackson 1043 (A, B, BM, C, DS, F, G, GH, K, MICH, MIN, MO, MSC, NY, P, POM, TEX, UC, US, WIS); Volcán de Agua, Johnston 581 (F); Santa Elena, Skutch 173 (NY, US); buena vista above Tecpán, Skutch 772 (DS, GH, US); Cerro de Tecpán, region of Santa Elena, Standley 58673 (F, GH); Cerro de Tecpán, region of Santa Elena, Standley 61029 (F). Dept. Huehuetenango: from Hacienda de Chancol, Nelson F 576068 (F); mountains near Hacienda de Chancol, Nelson 3644 (GH tracing, US); Sierra de los Cuchumantanes, along road beyond La Pradera, km 32, Standley 81782 (F). Dept. Quezaltenango: Cantón La Esperanza about 6 km from San Juan Ostuncalco, Molina, Burger & Wallenta 16641 (F, NY); mountains southeast of Palestina, on old road to San Juan Ostuncalco, Standley 84311 (F, G); Volcán Santo Tomás, Steyermark 34809 (F, US); about 5 km north of Ostuncalco, Williams, Molina & Williams 25474 (NY). Dept. Sacatepéquez: slopes of Volcán de Agua, above

Santa María de Jesús, Standley 65208 (F). Dept. San Marcos: indicated by personal correspondence with Dr. Dorothy Nash, Field Museum, Chicago, Williams, Molina & Williams 25925 (F). Dept. Totonicapán: forest of María Tecúm, Molina, Burger & Wallenta 16397 (F, NY); region of Chiu Jolóm, mountains above Totonicapán, on road to Desconsuelo, Standley 84409 (F); about 10 km airline south of Totonicapán, Williams, Molina & Williams 22916 (NY); Cerro María Tecúm, 10-20 km east of Totonicapán, Williams, Molina & Williams 23158 (BM, UC).

7. ARCHIBACCHARIS STANDLEYI Blake var. STANDLEYI, Journ. Washington Acad. Sci. 19: 271. 1929. Type: HONDURAS: Dept. Comayagua: vicinity of Siguatepeque, ele. 1080-1400 m, 14-27 February 1928, Standley 56193 (US!; photo. MIN!; isotypes: F! fragments, GH).

Erect shrubs; ca. 4-12 dm tall; rhizomatous. Stems obscurely fractiflex, terete or round-angled, the bases 1.5-3.2 mm in diam., graduating to ca. 1.0 mm above, the internodes 7.0-22.0 cm long, somewhat shiny, brown or purple, puberulous below, thickly puberulous with incurved brown hairs above. Leaves with petioles 1.0-3.0 mm long, puberulous; blades ovate or lance-ovate, 4.0-6.0 cm long, 1.5-2.5 cm wide, firmly chartaceous, rounded or subcordate at bases, long or short-acuminate and sometimes falcate at apices, margins distally serrulate or crenate, rarely subentire or entire, the upper surfaces dark-green, dull, densely hispidulous with antrorse hairs, the lower surfaces lighter green, dull, very sparsely hispidulous and dotted with superficial amber glands. Panicles convex on densely puberulous peduncles, the hairs mixed with superficial amber glands. Staminate Heads: 4.0-7.0 mm high ca. 3.0 mm wide, phyllaries 4-6 seriate, acute or acuminate, the outer triangular or oblong-lanceolate, puberulous, the inner linear-lanceolate and with few hairs; filiform ray flowers 2-5, pappus 2.8-4.2 mm long, white, corollas 2.6-3.9 mm long, white, the ligules erect, 0.7-1.2 mm long, achenes inane or apparently sometimes fertile, 0.8-0.9 mm long, 3-4 nerved, somewhat shiny and hispidulous, the hairs often irregularly mixed with whitish glandular hairs or superficial whitish glands; abnormal intermediate flowers may be present; disk flowers 7-15, white, pappus 3.4-4.6 mm long, white, tubes 1.7-2.2 mm long, puberulous above, limb 1.9-3.3 mm long, puberulous, lobes linear, 1.8-3.0 mm long, sparsely puberulous on the dorsal surfaces with some superficial whitish glands near the apices, style branches oblong or barely subclavellate, acute, achenes abortive, stipitiform.

Pollen diameters (microns): all preparations showed grains with abnormal forms although the protoplasts stained well; Standley 56193, Standley 56356.

Floral illustrations: Fig. 11.

A. Standley var. Standleyi is still inadequately known. The pistillate plant has not been collected.

This species is very closely related to A. Standleyi var. aequivenia from southern Mexico and Guatemala. The two taxa

differ in leaf morphology, number of florets on the staminate heads and perhaps also in the size of the plants. A. subsessilis from southern Mexico and Guatemala also shares characters with these taxa.

The admixture of floral types on the staminate heads reported by Blake (1929, p. 271) has been confirmed. The completely formed filiform ray flowers, though few, sometimes appear to be fertile. In addition, abnormal intermediate flowers were found.

Known only from the type locality in Comayagua, Honduras (Fig. 13). Collected on brushy and open rocky banks, 1080-1400 m ele.

HONDURAS: Dept. Comayagua: vicinity of Siguatepeque, Standley 56356 (F).

7a. ARCHIBACCHARIS STANDLEYI Blake var. AEQUIVENIA Blake, Brittonia 2: 340-341. 1937. Archibaccharis aequivenia (Blake) D. Nash, Fieldiana 36(9): 73. 1974. Type: GUATEMALA: Dept. Suchitepéquez: roadside bank, Finca Mocá, 937 m ele., 4 January 1935, Skutch 2056 (A!; photo. MIN!; isotype: F!).

Erect shrubs; ca. 19 dm tall; the subterranean parts and bases not seen. Stems obscurely fractiflex, terete or round-angled, 1.5-4.5 mm in diam. above, the internodes 5.0-34.0 cm long, barely shiny, brown, red-brown or dark gray-green, thickly brown or whitish puberulous above. Leaves with short petioles, 1.0-3.0 mm long, sometimes sessile, puberulous, often with pilosulous hairs; blades lanceolate, lance-elliptic or oblong-elliptic, 4.0-16.0 cm long, 1.5-3.5 cm wide, thinly chartaceous, cuneate or narrowly obtuse at bases, long-acuminate or often falcate at apices, margins distally serrulate, the upper surfaces dark-green, dull, finely hispidulous, the hairs often directed antrorsely and dotted with superficial amber glands, the lower surfaces lighter green, dull or somewhat shiny, sparsely hispidulous and often dotted with superficial amber glands. Panicles convex on densely puberulous peduncles. Pistillate Heads: 4.5-5.0 mm high, 2.5-3.0 mm wide, phyllaries 3-4 seriate, acute or acuminate, the outer narrowly triangular or oblong and puberulous, sometimes mixed with superficial amber glands, the inner lanceolate or linear-lanceolate and essentially glabrous; filiform ray flowers 26-31, pappus 2.9-3.7 mm long, white, corollas 2.7-3.0 mm long, white, puberulous above, the ligules erect, 0.4-1.0 mm long, achenes 1.4-1.6 mm long, 3-5 nerved, dull and hispidulous or perhaps sometimes hirtellous and with scattered superficial glands; disk flowers 1-3, pappus 2.8-3.6 mm long, corollas 3.2-3.5 mm long, white, anthers sterile, achenes inane or apparently sometimes fertile. Staminate Heads: ca. 8.0 mm high, 6.0 mm wide, phyllaries 3-4 seriate; filiform ray flowers 1 or more, pappus 2.8 mm long, corollas 2.2 mm long, white, achenes inane or apparently sometimes fertile; disk flowers 22-25, white, pappus 3.2-3.4 mm long, white, tubes 1.5-1.7 mm long, puberulous above, limb 1.9-2.6 mm long, puberulous, lobes linear, 1.8-2.3 mm long, sparsely puberulous on the dorsal surfaces, style

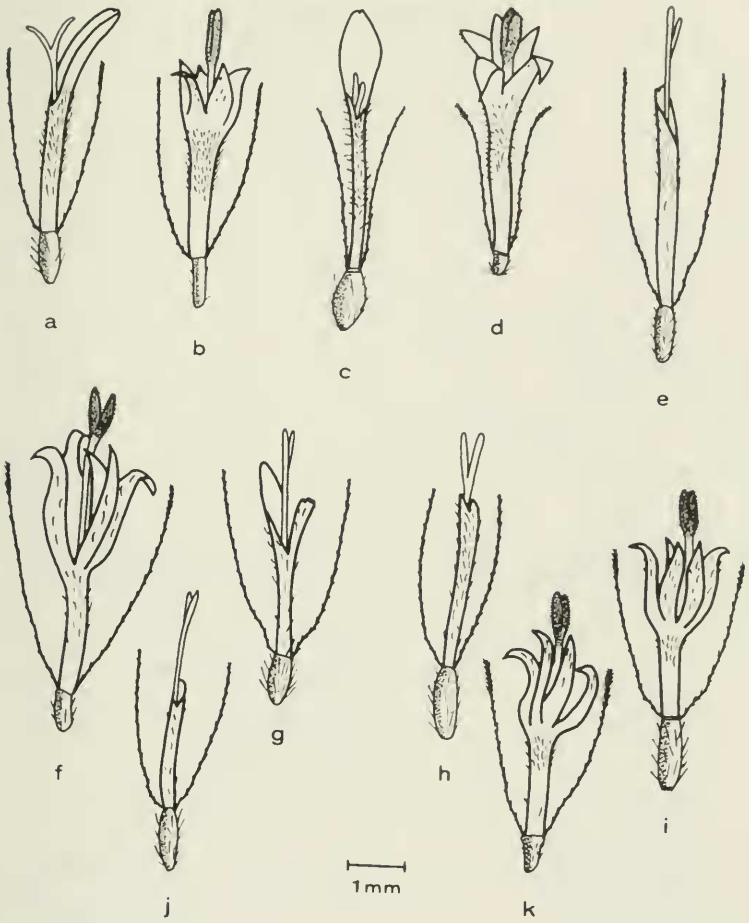


Fig. 11. Floral illustrations of Archibaccharis corymbosa, A. Standleyi var. Standleyi and A. Standleyi var. aequivenia. A. corymbosa (all from Jackson 1043): (a, b) pistillate heads: (a) filiform flower, (b) disk flower; (c, d) staminate heads: (c) filiform flower, (d) disk flower. A. Standleyi var. Standleyi (all from Standley 56356): (e, f, g) staminate heads: (e) filiform flower, (f) disk flower, (g) abnormal intermediate flower. A. Standleyi var. aequivenia: (h, i) pistillate heads (Skutch 2056): (h) filiform flower, (i) disk flower; (j, k) staminate heads (Matuda 4011): (j) filiform flower, (k) disk flower. Disk flowers are shown without anthers.

Fig. 12. Distribution of species of Archibaccharis in Guatemala. Square, A. corymbosa. Triangle, A. linearilobis.

Fig. 13. Distribution of varieties of Archibaccharis in Mexico and Guatemala. Triangle, A. Standleyi var. aequivenia. Circle, A. Standleyi var. Standleyi.

branches oblong or just linear, acute but sometimes obtuse, achenes abortive, inane or reduced to small knobs.

Pollen diameters (microns): polar, 21.0-23.3; equatorial, 22.2-24.4; Matuda 4011.

Floral illustrations: Fig. 11.

The staminate specimen of A. Standleyi var. aequivenia, unknown to Blake, may now be described. These heads appear to be at least sporadically heterogamous.

A. Standleyi var. aequivenia is closely related to A. Standleyi var. Standleyi from Honduras. The two taxa perhaps represent distinct biological species. The evidence currently available seemed insufficient to justify this decision.

Pubescence found on the two taxa is very similar. They differ vegetatively mainly in leaf characters. The leaves of var. aequivenia are much larger, thinner and lanceolate with rounded or subcordate bases. In the var. Standleyi the leaves are shorter, thicker and ovate or lance-ovate with strong lateral veins on the lower leaf surfaces. The bases are nearly cuneate or narrowly rounded.

Pistillate specimens of var. Standleyi are unknown (only three staminate specimens were available). A comparison of staminate head floral characters found them to be nearly indistinguishable except the heads of var. Standleyi had 7-15 disk flowers, those of var. aequivenia 22-25. This may provide a strong case for biological distinctness if further studies provide statistically significant differences. There is a need to demonstrate that the few known staminate specimens of var. Standleyi are not aberrant. These specimens were examined and found to possess abnormal pollen grains. They were deformed and could not be measured although the protoplasts appeared to stain well with cotton blue. New collections of both taxa are needed.

The heads from a pistillate specimen of Matuda 0700 from Mt. Ovando, Chiapas possessed central disk flowers bearing apparently fertile achenes but sterile anthers. The contents of one boiled achene appeared to be fully developed.

From Chiapas, Mexico and Quezaltenango and Suchitepequez, Guatemala (Fig. 13). Collected along roadside banks and on high barranco, 937-1300 m ele.

GUATEMALA: Dept. Quezaltenango: high barranco along Río Samalá, between Santa Maria de Jesús and Calahuachém, Steyermark 33893 (F). MEXICO: State of Chiapas: Mt. Ovando, Matuda 0700 (MICH, US); Mt. Ovando, Matuda 4011 (GH, MICH, MO, NY); Mt. Ovando, Matuda 16236 (US); Cerro del Boquerón, Purpus 6687 in part (BM, F, GH, MO, UC, US).

8. ARCHIBACCHARIS ASPERIFOLIA (Benth.) Blake, Contr. U. S. Nat. Herb. 23: 1509. 1926. Baccharis asperifolia Benth., Pl. Hartw. 86. 1841. Conyza asperifolia Benth. & Hook., Hemsl. Biol. Centr. Amer. Bot. 2: 126. 1881. Hemibaccharis asperifolia (Benth.) Blake, Contr. U. S. Nat. Herb. 20: 552. 1924. Type: GUATEMALA: Dept.

GUATEMALA: mountains of Mixco, 1840, Hartweg 589 (K!; photo. MIN!; isotypes: fragments, BM?! GH! K! NY! P!; photo. TEX!).

Baccharis scabridula T. S. Brandeg., Univ. Calif. Publ. Bot. 6: 77. 1914. Type: MEXICO: State of Chiapas: collected in the high region of Cerro del Boquerón, August 1913, Purpus 6665 (UC!; photo. MIN!; isotypes: BM! F! GH! MO! NY! US!).

Erect ligneous herbs (?); ca. 10-30(-65) dm tall; roots fibrous. Stems straight below, usually obscurely fractiflex above, terete, usually glaucescent at least below, the bases 3.0-12.0 mm in diam., graduating to 1.0-4.0 mm above, the internodes 2.0-8.0 cm long, shiny, usually red-purple or dark-purple but sometimes green, glabrous usually to just below the inflorescences, often whitish tomentulose but sometimes subglabrous. Leaves with petioles 2.0-15.0(-20) mm long, essentially glabrous below, puberulous or subglabrous above; blades usually elliptical or lance-elliptic but sometimes obovate, oblanceolate, rarely ovate or oblong-ovate, 2.0-14.5 cm long, 1.0-5.0 cm wide, chartaceous or thickly so, attenuate, cuneate or variously obtuse at bases, acuminate, short-acuminate or rarely obtuse at apices, margins distally serrate, serrulate or merely denticulate, rarely entire, scabrous or with some pilosulous hairs, the upper surfaces dark-green, dull, usually scabrous but sometimes puberulous or thinly hirtellous, rarely subglabrous, the lower surfaces lighter green, dull, often with pilosulous and hirtellous hairs, rarely subglabrous. Panicles convex or pyramidal on subglabrous to tomentulose peduncles, the hairs sometimes crisped. Pistillate Heads: 4.0-5.5(-7.5) mm high, 3.0-4.5(-6.0) mm wide, phyllaries 4(-5) seriate, acute or rarely acuminate, the outer and inner ones linear-lanceolate, glabrous; filiform ray flowers 25-55(-69), pappus 2.4-3.6(-4.0) mm long, white, rarely brown-tinged or rufous, corollas 1.9-3.0(-3.8) mm long, white or cream-white, puberulous above, the ligules erect, 0.1-0.6 mm long, achenes 0.9-1.5(-1.8) mm long, (2-)3(-4) nerved somewhat shiny and hispidulous; disk flowers 1-7, pappus 2.4-3.4 (-4.1) mm long, corollas 2.8-4.1(-4.6) mm long, white or cream-white, anthers sterile, achenes inane or apparently sometimes fertile; abnormal intermediate flowers sometimes present. Staminate Heads: 4.0-5.5(-7.0) mm high, 3.0-4.0(-5.5) mm wide, phyllaries ca. 4 seriate; filiform ray flowers occurring sporadically, 0-4, pappus ca. 2.2 mm long, corollas 1.6-2.0 mm long, white or cream-white, achenes inane or apparently sometimes fertile; abnormal intermediate flowers sometimes present; disk flowers 22-44(-56), white or cream-white, pappus 2.3-3.3(-3.7) mm long, white, rarely brown-tinged or rufous, tubes 1.1-1.8(-2.2) mm long, puberulous above, limb 1.5-2.9 mm long, puberulous, lobes triangular or oblong, 0.8-1.5 mm long, sparsely puberulous on the dorsal surfaces, style branches oblong, barely lanceolate or linear, acute, achenes abortive, reduced to small knobs.

Chromosome number: n = 9 (Jackson, 1969), Fig. 1; n = 9 (Solbrig et al., 1969).

Pollen diameters (microns): polar, 17.8-20.0; equatorial, 20.0-22.2; Jackson 1039, Standley 61051.

Floral illustrations: Fig. 14.

Archibaccharis asperifolia is usually distinct with its combination of usually elliptical leaves with scabrous upper surfaces and terete, shiny, purple or green glabrous stems with noticeably ascending branches above.

A. asperifolia was observed by the author throughout much of its range. This species appears to possess herbaceous stems which develop considerable woody tissue in one growing season. The stem becomes rather woody and rigid. Stem cross-sections taken from larger specimens indicated only one year's growth. In contrast, A. sescenticeps, a closely related species, clearly possesses periennial stems. Examples were examined which exhibited several seasons accumulation of wood.

As with other Archibaccharis taxa, this species presented many examples of sporadically occurring filiform ray flowers on the staminate heads. Abnormal intermediate flowers were found on both staminate and pistillate heads.

Although the vegetative and floral characters matched very well with those of A. asperifolia, the large pistillate and staminate heads found on Rzedowski 2198 from Tlalmanalco, State of Mexico, probably represents an extreme variation of the species. Staminate specimens from a Müller collection, probably from Vera Cruz, were similarly large. In fact, Blake had made a pencil note on the Müller sheet (NY), "probably, but heads very large," giving his response to the handwritten label on the sheet, "Baccharis asperifolia."

From Jalisco and San Luis Potosi, Mexico, south to northern Nicaragua, a widespread species (Fig. 15). Collected in high, damp forested zones and on rocky slopes, 1260-3900 m ele. One collection was taken from the cinder cone of Volcán Atitlán in Guatemala. The author has not infrequently noted this species along roadsides in rather open exposures throughout much of its distribution.

GUATEMALA: Dept. Alta Verapaz: southeast of Cobán adjacent to gravel road to San Juan Chamelco, Jackson 1039 (F, GH, K, MIN, MO, NY, P, US); near Cobán, Standley 69218 (F, NY); region of Chelac, northeast of Carcha, Standley 70400 (F); Cobán, von Türckheim 385 (BM, GH, K, MICH, NY, P, US); Cobán, von Türckheim II 1637 (BM, C, F, G, GH, MICH, MO, NY, UC, US). Dept. Baja Verapaz: mountainside north of divide north of Santa Rosa, Standley 69925 (F, NY). Dept. Chimaltenango: Volcano Chimaltenango, Kellerman 6117 (F); Volcán de Fuego, Salvin & Godman s.n. (K); Chichavac, Skutch 331 (DS, MICH, NY, US); region of Santa Elena, Cerro de Tecpán, Standley 61051 (F, GH, NY); barranco do la Sierra, southeast of Patzún, Standley 61674 (F). Dept. El Progresso: between Calera and summit of Volcán Siglo, Steyermark 43091 (F, GH); hills north of Finca Piamonte, between Finca Piamonte and summit of Volcán Santa Luisa, Steyermark 43565 (F). Dept. Guatemala: San Rafael, Holway 46 (GH); Volcán de Pacaya, above Las Calderas, Standley 58427 (F); hills south of Mixco, Williams & Molina 11769 (F). Dept. Huehuetenango: along road to Huehuetenango, 7 miles south of San Juan Ixcoy, Municipio of San Juan Ixcoy, Breedlove 8516 (DS, F, MICH); between San

Martin and Todos Santos, Nelson 3617 (US); near Chiantla, along the river and east of town, Standley 82495 (F). Dept. Quezaltenango: Palmar, Skutch 1444 (GH); slopes of Volcán de Santa Maria, above Palojunoj, Standley 67546 (F); mountains above San Juan Ostuncalco, on road to Palestina, Standley 85250 (F, US); mountains about 4 km north of Olintepeque, Williams, Molina & Williams 22866 (GH, NY). Dept. Quiché: no specific location, Aguilar 1198 (F). Dept. Sacatepéquez: Volcán de Agua, Kellerman 7423 (F); slopes of Volcán de Agua, north of Santa María de Jesús, Standley 59376 (F, NY). Dept. San Marcos: above Río Tacaná, near San Antonio, Standley 66114 (F, GH); upper south-facing slopes of Volcán Tajumulco, between Las Canojas and top of ridge, 7 miles from San Sebastían, Steyermark 35885 (F); about 6 km (airline) north of San Marcos, Williams, Molina & Williams 25866 (UC); outer slopes of Tajumulco Volcano, about 8-10 km west of San Marcos, Williams, Molina, Williams, Gibson & Laskowski 26773 (BM, GH); road to Tajumulco Volcano, near San Andrés, Williams Molina, Williams, Gibson & Laskowski 27051 (NY). Dept. Solola: Volcán Santa Clara, Steyermark 46893 (F). Dept. Suchitepéquez: south side of cinder cone of Volcán Atitlán, Skutch 2134 (F, GH, US). Dept. Totonicapán: about 8-10 km (airline) south of Totonicapán, Williams, Molina & Williams 22923 (GH, NY). Dept. Zacapa: along Río Repollal to summit of mountain, Steyermark 42550 (F, US). HONDURAS: Dept. Morazán: Mt. Uyuca, Williams, Molina & Merrill 15592 (F, GH); drainage of the Rio Yeguare, Williams & Molina 17170 (G, GH); Cerro de Uyuca, along trail from Las Flores to La Labranza, Standley 25911 (F). MEXICO: State of Chiapas: along the road just above Tenejapa Center, Municipio of Tenejapa, Breedlove 6893 (DS, F, MICH); Titotole, Linden 426 (G, P); Mt. Ovando, Escuintla, Matuda 16251 (MO, US); Paraje Matsab, Municipio of Tenejapa, Ton 509 (DS, MSC, NY, WIS); Paraje of Matsab, Municipio of Tenejapa, Ton 1270 (DS, MICH). State of Jalisco: northern slopes of Nevado de Colima, above the sawmill called Piedra Ancha and just east of the first great canyon west of the sawmill site, McVaugh 11691 (MICH); stream bed, Arroyo del Notoguio, San Sebastian, Mexia 1670 (A, BM, DS, F, G, GH, MICH, MIN, MO, NY, UC, US); cañons between Mascota and San Sebastián, Nelson 4055 (GH). State of Mexico: Mt. Ixtaccihuatl, Deam s.n. (GH); Mesón Viejo, Temascaltepec, Hinton 3266 (F, GH, K, MO, MICH, NY); Cumbre-Gavia locality, Temascaltepec, Hinton 8836 (GH, K, MICH, NY, US); Salto de Agua, Purpus 1500 (BM, F, GH, MO, NO, POM, UC, US). State of Michoacan: 10 miles north of west of Ciudad Hidalgo and a few miles north of village of San Pedro Aguaro, McVaugh & Wilbur 9932 (MICH, US). State of Oaxaca: Sta. Inés del Monte, Zimatlán, Conzatti 1330 (GH); Sierra de San Felipe del Agua, Jackson 1027 (B, BM, C, DS, F, GH, K, MICH, MIN, MO, MSC, NY, P, POM, TEX, UC, US, WIS); Barranca del Ranchito, Petlacala, Mexia 9092a (F, GH, NY, UC, US); Sierra de San Felipe, Pringle 6051 (BM, GH, K, MICH, MIN, MO, MSC, NY, P, US); Sierra de San Felipe, Smith 262 (F, MO, NY, US); Sierra de San Felipe, Smith 306 (BM, NY); El Punto, 28 km northeast of Oaxaca, along the

road to Ixtlán de Juarez, Rzedowski 19236 (DS, MICH, TEX). State of Puebla: woodlands near Honey Station, Pringle 15008 (GH, MICH, MIN, MSC). State of San Luis Potosi: d'Aoust 278 (P). State of Vera Cruz: Vera Cruz, Sartorius s.n., P56170 (P). NICARAGUA: Dept. Jinotega: San Rafael del Norte, Miller & Griscom 24 (US); San Rafael del Norte, Miller & Griscom 86 (US).

9. ARCHIBACCHARIS CALONEURA Blake, Proc. Biol. Soc. Washington 55: 117-118. 1942. Type: MEXICO: State of Oaxaca: lower slopes, Mt. Zempoaltepetl, 19-27 February 1937, Camp 2701 (NY!; photo. MIN!; photo and fragments, US!).

Erect shrubs; ca. 15-25 dm tall; the subterranean parts and the bases not seen. Stems straight or nearly so, terete or subterete, 1.5-4.5 mm in diam. above, the internodes 1.0-3.0 cm long above, somewhat shiny, brown or dark-purple, glabrescent above with a few hispidulous and puberulous hairs on the branches and branchlets. Leaves with petioles 3.5-10.0 mm long, sparsely hispidulous; blades mostly oblong-ovate but sometimes elliptical, 3.5-8.5 cm long, 2.0-3.5 cm wide, pergamentaceous, cuneate, attenuate or barely obtuse at bases, long or short-acuminate and straight or falcate at apices, margins usually serrate or serrulate nearly to the bases but sometimes merely denticulate, sparsely hispidulous, the upper surfaces dark-green, somewhat shiny, subglabrous with a few hirtellous hairs, the lower surfaces dark-green but lighter than the upper surfaces, shinier than the upper surfaces, essentially glabrous. Panicles convex on antrorsely hispidulous peduncles. Pistillate Heads: 5.0-6.0 mm high, 4.0-4.5 mm wide, phyllaries 5-6 seriate, acute or obtuse, the outer ovate or triangular-ovate and glabrous, the inner linear-lanceolate and glabrous; filiform ray flowers 20-24, pappus 3.4-4.0 mm long, white, corollas 2.0-2.7 mm long, white, hirtellous, the hairs denser near the apices which they may exceed, the ligules erect, obscure, 0.1-0.2 mm long, achenes 1.2-2.0 mm long, 2-3 nerved, somewhat shiny and hispidulous; disk flowers 2-4, pappus 3.7-4.2 mm long, corollas 3.8-4.5 mm long, white, anthers sterile, achenes abortive, inane but sometimes apparently fertile or reduced to small knobs; abnormal intermediate flowers sometimes present. Staminate Heads: 5.0-6.0 mm high, 4.0-6.0 mm wide, phyllaries 5-6 seriate; disk flowers 24-36, white, pappus 3.0-4.2 mm long, white, irregular, composed of basally contorted and connate mixed groupings of regular, very slender barbellate pappus bristles and papillose structures which are ligulate, linear-lanceolate or attenuate to long slender or obtuse apices, the papillose structures usually covered with minute glandular structures, tubes 1.5-2.4 mm long, puberulous above, limb 1.9-2.9 mm long, puberulous, lobes lance-oblong, 1.6-2.1 mm long, the dorsal surfaces obscurely puberulous, style branches linear, acute achenes abortive, completely reduced to small, glabrous knobs.

Chromosome number: n = 9 (recorded on Breedlove 7798 as represented in the University of Michigan Herbarium).

Pollen diameters (microns): polar, 22.2-24.4; equatorial,

24.6-28.9. Breedlove 7798; Camp 2698.

Floral illustrations: Fig. 14.

The glabrous features of A. caloneura perhaps relate it to A. asperifolia and A. androgyna. The most recent collection of this species, Breedlove 7798 (MICH), a staminate specimen from Chiapas, was distributed as A. androgyna. The irregular pappus of the disk flowers found on the staminate heads make this species unique among all Archibaccharis taxa.

A new collection site was established in Oaxaca for A. caloneura with the discovery that Jurgenson 372, on loan from Kew Royal Botanic Gardens, belonged to this taxon. That particular specimen was cited long ago as being Conyza asperifolia (Benth. & Hook., 1881, p. 126).

Abnormal intermediate flowers were found on the pistillate heads of Jurgenson 372.

From Chiapas and Oaxaca, Mexico (Fig. 16). This erect shrub was reported as being collected on steep, moist slopes and in high, wooded areas, 2800-2900 m ele.

MEXICO: State of Chiapas: northeast slope of Zontehuitz near the summit, Municipio of Chamula, Breedlove 7798 (MICH). State of Oaxaca: middle slopes, Mt. Zempoaltepetl, Camp 2698 (NY); Sierra San Pedro Nolasco &c., Jurgenson 372 (K).

10. ARCHIBACCHARIS ANDROGYNA (T. S. Brandeg.) Blake, Contr. U. S. Nat. Herb. 23: 1509. 1926. Baccharis androgyna T. S. Brandeg., Univ. Calif. Publ. Bot. 6: 77. 1914. Hemibaccharis androgyna (T. S. Brandeg.) Blake, Contr. U. S. Nat. Herb. 20: 552. 1924. Type: MEXICO: State of Chiapas: Cerro del Boquerón, September 1913, Purpus 6666 (UC!; photo. MIN!; isotypes: A! BM! F! GH! MO! NY! US!).

Erect shrubs; ca. 6-24 dm tall; above-ground parts glabrate with any pubescence light-colored except in one form with a fine, black glandular pubescence on the upper portions of the stems, phyllaries and floral organs; roots fibrous. Stems essentially straight, terete, shiny, the bases 1.6 cm or less in diam., graduating to 2.0-5.0 mm in diam. above, the internodes 10.0-33.0 mm long, green, brown or reddish-brown, glabrous. Leaves with short petioles, 1.0-3.0 mm long, glabrous; blades narrowly lanceolate, 5.0-12.0 cm long, 0.7-2.5 cm wide, thinly chartaceous, cuneate or narrowly obtuse at bases, gradually long-acuminate and often falcate at apices, margins distally serrulate, glabrate, the upper surfaces dark-green but often colored with red, shiny, glabrate, the lower surfaces dark-green but lighter than the upper surfaces, shiny, glabrate. Panicles convex, arranged on glabrous peduncles. Heads: 3.4-5.0 mm high, 3.2-4.0 mm wide, phyllaries 4-5 seriate, acute, the outer triangular, oblong or less often ovate and glabrous, the inner linear or linear-lanceolate and glabrous; filiform ray flowers 17-30, pappus 1.8-3.4 mm long, white, corollas 1.7-3.0 mm long, white, puberulous from near the bases to just below the ligules or on the lower two-thirds if the ligules are

absent, the ligules erect when present, 0.5-0.9 mm long, achenes 0.7-1.4 mm long, 2-3 nerved, somewhat shiny and hispidulous; disk flowers 1-15, white, pappus 2.4-3.6 mm long, white, corollas 3.2-4.8 mm long, the tubes puberulous above, the throats very short, lobes oblong, 1.1-1.7 mm long, glabrous, anthers functional at least in some populations, perhaps not in others, style branches oblong or subclavellate, acute, achenes abortive, inane and reduced or completely reduced to small knobs.

Chromosome number: n = 9 (Jackson, 1969), Fig. 1.

Pollen diameters (microns): polar, 16.7-22.0; equatorial, 17.8-24.4; Jackson 1034, Ton 706.

Floral illustrations: Fig. 14.

Vernacular names: "Copalilla" in department Huehuetenango, Guatemala.

A. androgyna may be closely related to A. asperifolia and A. caloneura.

Blake, (1924, p. 552) after study of one specimen from the type collection, regarded the species as polygamodioecious and noted "the staminate plant is unknown." All heads on the the type collection were heterogamous, appearing like the usual Archibaccharis pistillate head. The anther sacs of the disk flowers seem to be sterile.

A thorough search by the author through a population of A. androgyna near Navenchauc, Chiapas, Mexico in late December, 1968 revealed no "staminate" plants. Rather, all the plants appeared to be completely capable of the monoecious condition in that all heads contained both filiform ray flowers with fertile achenes and disk flowers bearing functional anthers and abortive achenes. The disk flowers in the heads varied in number from few to many, even when heads on the same plant were compared. Attempts to identify staminate and pistillate plants failed. Chromosome counts were obtained from the anther sacs of the disk flowers.

During the dissection of Jackson 1034 some abnormal flowers were found. Seven lobes were counted on one disk flower. Another flower appeared to be partly disk flower and partly filiform ray flower. Abnormal intermediate flowers were also found during the dissection of Steyermark 36214 from department San Marcos, Guatemala.

The fact that A. androgyna appears to at least sometimes be functionally monoecious further justifies its retention in the genus Archibaccharis. The flowers do show some evolutionary loss and the stems are woody perennials, a habit not usually associated with the genus Conyza, the only other genus to which this species could reasonably be referred.

Steyermark 51922 from Huehuetenango, Guatemala appears to be a local form of this species. The specimens were in fruit and nearly all floral material had been lost. In this form, a thin, black, apparently glandular pubescence was found on the upper branches, peduncles, dorsal and ventral phyllary surfaces, ray and disk corollas, style branches and on the fertile achenes where it was intermixed with the hispidulous hairs typical of the species. Steyermark had made a note on the sheet, "crushed leaves with the

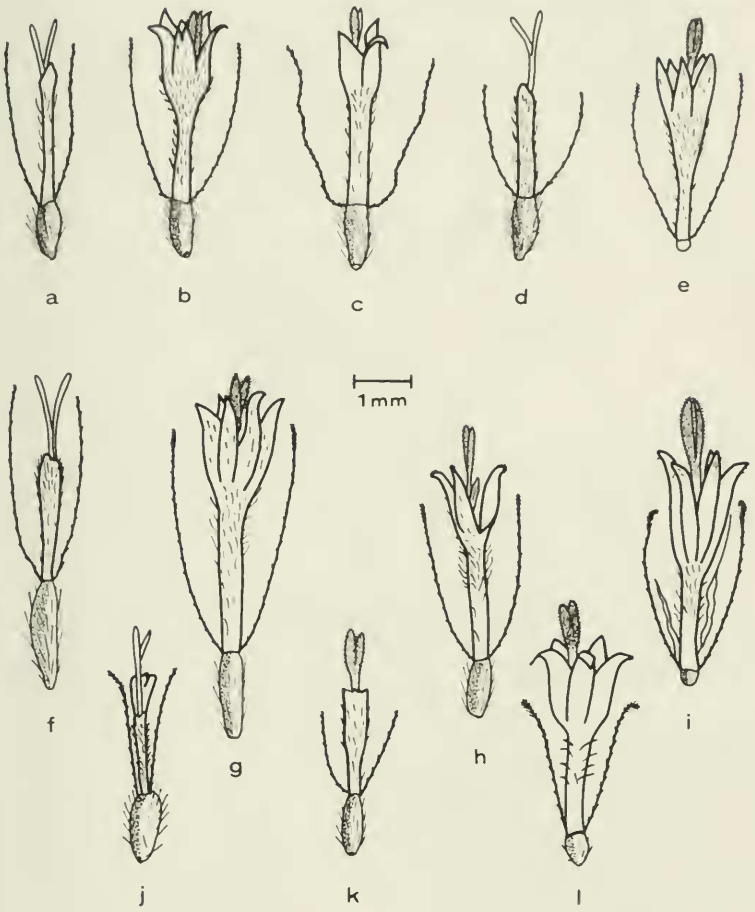


Fig. 14. Floral illustrations of Archibaccharis asperifolia, A. caloneura and A. androgyna. A. asperifolia: (a, b) pistillate heads: (Jackson 1027); (a) filiform flower, (b) disk flower; (c, d, e) staminate heads: (c) abnormal intermediate flower (Hinton 3266); (d) filiform flower (Pringle 15008); (e) disk flower (Jackson 1027). A. caloneura: (f, g, h) pistillate heads (Camp 2701); (f) filiform flower, (g) disk flower, (h) abnormal intermediate flower; staminate heads: (i) disk flower (Camp 2698). A. androgyna: (j) filiform flower (Jackson 1034), (k) abnormal intermediate flower (Steyermark 36214), (l) disk flower (Jackson 1034). Disk flowers are shown without anthers.

Fig. 15. Distribution of Archibaccharis asperifolia in Mexico and Central America.

Fig. 16. Distribution of species of Archibaccharis in Mexico and Guatemala. Circle, A. androgyna. Triangle, A. caloneura.

odor of dill." This characteristic was verified by the author when the Navenchauc population was studied.

From Chiapas, Mexico as well as Huehuetenango and San Marcos, Guatemala (Fig 16). This perennial shrub grows in moist woods and along shaded, moist cliffs, 700-2812 m ele.

GUATEMALA: Dept. Huehuetenango: above Macx, between Todos Santos and San Martín, Sierra de los Cuchumantanes, Steyermark 51922 (F, US); along quebrada Canjulá, between Sibinal and Canjulá, Volcán Tacaná, Steyermark 35976 (F); between La Vega ridge along Río Vega and northeast slopes of Volcán Tacaná, to 3 miles from Guatemala-Mexico boundary in vicinity of San Rafael, Steyermark 36170 (F); same location as preceding, Steyermark 36214 (F, GH). MEXICO: State of Chiapas: on moist, steep slope along Mexican highway #190, 2 km west of Navenchauc, Breedlove 7988 (F, MICH); steep, moist, rocky hillside, ca. 1 km west of Navenchauc, along Mexican highway #190, Jackson 1034 (A, B, BM, C, DS, F, G, GH, K, MICH, MIN, MO, MSC, NY, P, POM, TEX, UC, US, WIS); Municipio of Zinacantán, northwest side of Cerro Huitepec, Laughlin 511 (DS, MSC, NY, WIS); Piñuela, Mount Ovando, Matuda 5004 (F, UC); Cerro del Boquerón, Purpus 6687 in part (NY); Municipio of Tenejapa, Steep slope in the Paraje Matsab, Ton 706 (DS, MSC, NY, WIS).

11. ARCHIBACCHARIS SESCENTICEPS Blake, Contr. U. S. Nat. Herb. 23: 1509. 1926. Hemibaccharis sescenticeps Blake, Contr. U. S. Nat. Herb. 20: 552. 1924. Type: MEXICO: State of Mexico: in moist, open woods and along creeks, Mt. Ixtaccihuatl, 2135-2440 m ele., November 1905, Purpus 1501 (US!; photo. MIN!; isotypes: BM! C! DS! F! GH! MO! POM! UC!).

Erect shrubs; ca. 10-50 dm tall; roots fibrous. Stems straight below, usually obscurely fractiflex above, usually angled, glaucescent, the bases 3.0-20.0 mm in diam., graduating to 2.0-7.0 mm above, stout, the internodes 1.5-5.5 cm long, dull, purple, gray-purple or green-brown, glabrous below, becoming thinly arachnose then whitish or gray arachnose-tomentulose above. Leaves with usually long petioles, 5.0-35.0 mm long, puberulous with some arachnose hairs below, arachnose above; blades usually oblong-ovate, ovate or rarely elliptical, 6.0-14.0 cm long, 2.0-6.5 cm wide, usually chartaceous but sometimes membranaceous, obtuse or cuneate at bases, acuminate at apices, margins distally serrate, glabrous or hispidulous, upper surfaces dark-green, dull, hispidulous or sometimes glabrous, lower surfaces lighter green, dull, usually glabrous but sometimes subglabrous with puberulous and arachnose hairs. Panicles pyramidal on arachnose-tomentulose peduncles. Pistillate Heads: 4.0-6.0 mm high, 2.5-4.0 mm wide, phyllaries ca. 4-seriate, acute, sometimes acuminate, linear or linear-lanceolate, the outer ones sometimes with scattered puberulous hairs, rarely arachnose; filiform ray flowers 21-46, pappus 2.5-3.2 mm long, white, corollas 1.8-2.5 mm long, creamy-white, puberulous above, the ligules erect, short, 0.1-1.4 mm long,

glabrous, achenes 0.8-1.3 mm long, 2-3 nerved, somewhat shiny and hispidulous; disk flowers 1-3, pappus 2.5-3.2 mm long, corollas 2.8-3.6 mm long, creamy-white, anthers sterile, achenes inane or apparently sometimes fertile; abnormal intermediate flowers sometimes present. Staminate Heads: 4.0-5.0 mm high, 2.5-3.5 mm wide, phyllaries ca. 4-seriate; disk flowers 17-29, creamy-white, pappus 2.1-3.0 mm long, white, tubes 1.3-2.0 mm long, puberulous above, limb 1.2-2.1 mm long, puberulous, lobes usually oblong or merely acute but sometimes linear, 0.7-1.3 mm long, the dorsal surfaces glabrous or with a few puberulous hairs, style branches oblong or linear, acute, achenes abortive, inane or reduced to small knobs or sometimes apparently fertile.

Chromosome number: n = 9 (Jackson, 1969), Fig. 1.

Pollen diameters (microns): polar, 17.6-23.3; equatorial, 18.9-25.0; Jackson 1047, Purpus 1501.

Floral illustrations: Fig. 17.

Archibaccharis sescenticeps is distinguished by its angled, purple, glabrescent, stout, arachnose-tomentulose stems. Examination of wood accumulation in older stems clearly show the perennial nature of the species. The floral morphology appears to differ little from that of A. asperifolia, a more widespread species with which it is partially sympatric and whose stems have not been shown to be perennial.

The specimens cited by Blake (1924, p. 552) when he first described A. sescenticeps have been seen by the author with the exception of Nelson 4055 (US). As represented in the Gray Herbarium, the specimen of that collection lacks arachnose-tomentulose hairs on essentially glabrous, terete stems and has been cited in this paper as A. asperifolia.

Abnormal intermediate flowers were found on the pistillate heads of some specimens.

From Mexico, D. F. and the states of Guerrero, Hidalgo, Mexico and Michoacan (Fig. 18). This perennial shrub has been collected in oak woods, on granitic slopes, pine forests, pine-covered slopes, moist barrancas and slopes, 2100-3500 m ele.

MEXICO: Federal District: Contadero, Lyonnet 375 (BM, GH, K, MO, NY, US). State of Guerrero: at and just below summit of Cerro Alquitrán, 17-18 km by road west of Mexican Highway #95 and Mazatlán, Anderson & Laskowski 411 (MICH); about 10 km west of Chilpancingo, Feddema 2759 (MICH); Teotepec locality, Galeana District, Hinton 11138 (G, K, MICH, P, US); Teotepec locality, Galeana District, Hinton 14784 (F, GH, MO, US); top of Sierra Madre near Chilpancingo, Nelson 2203 (US); Carrizal, 9 km west of Camotla, Municipio of Chichihualco, Rzedowski 18014 (MICH, MSC, WIS); same location as the preceding, Rzedowski 18015 (DS, MICH, MSC, WIS); El Asoleadero, 15 km west of Camotla, Municipio of Chichihualco, Rzedowski 18079 (DS, MICH, MSC, WIS); more or less 2 km northeast of Campamento El Gallo, western spur of Cerro Teotepec, Rzedowski & McVaugh 194 (MICH, MSC). State of Hidalgo: near Real del Monte above Pachuca, Sharp 441078 (NY). State of Mexico, Desierto Viejo, Berlandier 1167 (BM); San Nicolás near

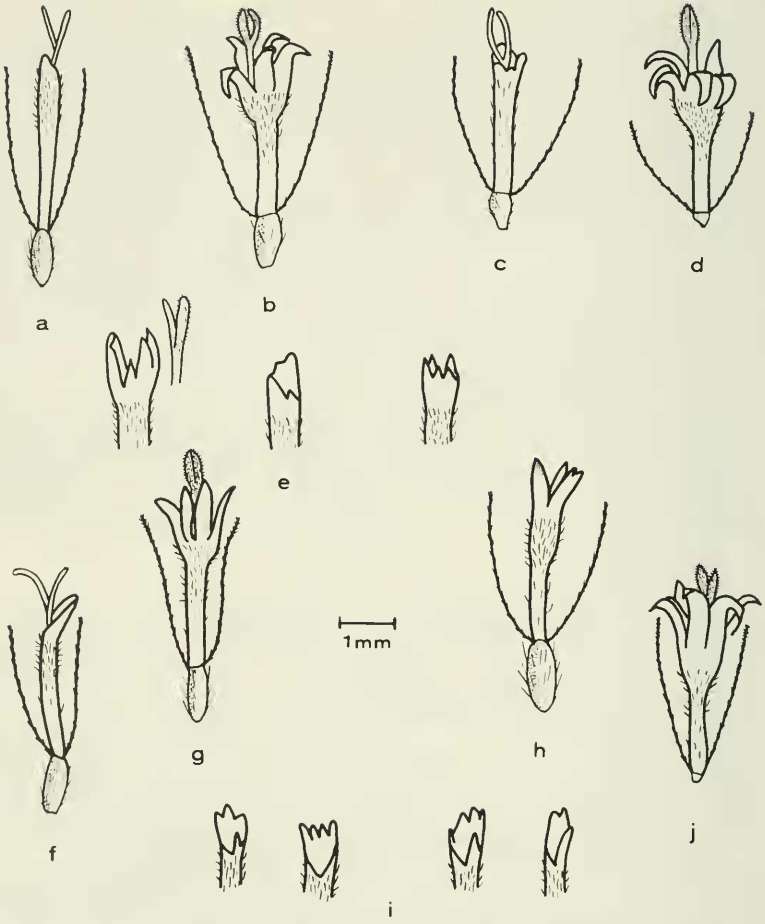


Fig. 17. Floral illustrations of Archibaccharis sescenticeps and A. serratifolia. A. sescenticeps: (all from Jackson 1047): (a, b, c) pistillate heads: (a) filiform flower, (b) disk flower, (c) abnormal intermediate flower; (d, e) staminate heads (d) disk flower, (e) apices of abnormal intermediate flowers. A. serratifolia: (f, g) pistillate heads (Jackson 1048): (f) filiform flower, (g) disk flower, (h) abnormal intermediate flower (Jackson 1037), (i) apices of abnormal intermediate flowers, (Jackson 1048); staminate heads: (j) disk flower (Pringle 11288). Disk flowers are shown without anthers.

Fig. 18. Distribution of Archibaccharis sescenticeps in Mexico.

Mexico, Bourgeau 970 in part (C, G, GH, K, P, US); collines near Maromas, Valley of Mexico, Bourgeau 1092 (P); south Mexico, San Nicolás, Valley of Mexico, Bourgeau 1228 (C, GH, K, NY, P, US); Amecameca, Goodding 2159 (UC); Comunidad locality, District of Temascaltepec, Hinton 2461 (GH, UC, US); 18 miles west of Mexico City on Highway 15, Hunsaker II (TEX); Mesón Viejo, along Mexican Highway #130, Jackson 1047 (B, BM, C, DS, F, G, GH, K, MICH, MIN, MO, MSC, NY, P, TEX, UC, US); San Rafael, Municipio of Tlalmanalco, Jiménez 199 (MSC); Contreras, Matuda 18622 (NY); around Amecameca, Matuda 25740 (NY); San Rafael, foothill east of Ixtaccihuatl, Matuda 27568 (NY); 3 km east of San Rafael, municipio of Tlalmanalco, Rzedowski 19347 (MICH, MSC, WIS); Propae las Maromas, Woronow & Juzepczuk 1049 (US). State of Michoacan: ca. 18 miles south of Pátzcuaro, King & Soderstrom 5210 (MICH, NY, TEX, UC).

12. ARCHIBACCHARIS SERRATIFOLIA (H.B.K.) Blake, Contr. U. S. Nat. Herb. 26: 236. 1930. Baccharis serratifolia H.B.K., Nov. Gen. & Sp. 4: 59. 1820. Type: MEXICO: State of Guanajuato: on steep slopes between Santa Rosa and Los Ioares, 2600 m ele., September, no year given, H.B.K. 31 (P!).

Baccharis mucronata H.B.K., Nov. Gen. & Sp. 4: 60. 1820. Hemibaccharis mucronata (H.B.K.) Blake, Contr. U. S. Nat. Herb. 20: 550-551. 1924. Archibaccharis mucronata (H.B.K.) Blake, Contr. U. S. Nat. Herb. 23: 1508. 1926. Type: MEXICO: State of Guanajuato: growing with H.B.K. no. 31, H.B.K. 32 (P!; photo., MSC!).

Baccharis micrantha H.B.K., Nov. Gen. & Sp. 4: 60. 1820. Type: MEXICO: State of Guanajuato: near Guanajuato, ca. 2000 m ele., September, no year given, H.B.K. 33 (P!).

Pluchea floribunda Hemsl., Diag. Pl. Mex. 2: 32-33. 1879. Type: MEXICO: State of Vera Cruz: Mirador, Linden 1171 (Lectotype: as part of a mixed sheet including Galeotti 2308, also A. serratifolia, K!; photo., MIN!; isolectotypes: G! P!).

Diplostephium paniculatum Donnell Smith, Bot. Gaz. 23: 8-9. 1897. Hemibaccharis mucronata paniculata (Donn. Smith) Blake, Contr. U. S. Nat. Herb. 20: 551. 1924. Archibaccharis mucronata paniculata (Donn. Smith) Blake, Contr. U. S. Nat. Herb. 23: 1508-1509. 1926. Archibaccharis mucronata var. paniculata (Donn. Smith) Blake, Amer. Journ. Bot. 15: 64. 1928. Archibaccharis serratifolia var. paniculata (J. D. Sm.) Blake, Journ. Washington Acad. Sci. 21: 328. 1931. Type: GUATEMALA: Dept. Huehuetenango: between San Martín and Todos Santos, 2180-2656 m ele., December 1895, Nelson 3629 (US!; photo., MIN!; isotype: GH!).

Erect or rarely arching shrubs; 5-30 dm tall; above-ground parts with variable pubescence which is whitish, canescent, cinereous or sometimes sordid; roots fibrous, the plants sometimes rhizomatous. Stems straight below, straight or obscurely fractiflex above, usually angled but sometimes terete, the bases 1.5-10.0 mm in diam., graduating to 1.0-4.0 mm above, the internodes 1.0-7.0

cm long, dull, reddish-brown, brown, gray-brown, dark-purple, reddish-purple or reddish, glabrescent below, densely or sparsely tomentose or tomentulose but sometimes with shorter, somewhat harsh pubescence, these hairs always present for a considerable distance from the stem apices. Leaves with petioles, 0.7-15.0 mm long, rarely lacking, tomentose or puberulous; blades variable, ovate, lance-ovate, lanceolate, oblong-ovate or elliptical, 4.5-17.0 cm long, 1.5-5.0(-7.5) cm wide, chartaceous but often thickly so, usually abruptly cuneate at bases, rarely attenuate or obtuse, long or short-acuminate or acute at apices, margins distally serrate, serrulate or merely denticulate, hispidulous or with less harsh hirtellous or pilosulous hairs, upper surfaces dark-green, somewhat glossy or dull, hirtellous or hispidulous, sometimes pilosulous, often with a mixture of hair types which vary in length, density and texture, lower surfaces lighter green, somewhat glossy or dull, densely tomentose, tomentulose, hispidulous, pilosulous, hirtellous or with mixtures of these hairs which may vary greatly in length, density and texture. Panicles pyramidal on tomentose, tomentulose, pilosulous or sometimes hirtellous peduncles. Pistillate heads: 4.0-5.0 mm high, 2.5-3.5 mm wide, phyllaries 4-5 seriate, acute or obtuse, linear or linear-lanceolate, the outer ones sometimes sparsely puberulous, the inner ones glabrous; filiform ray flowers 18-40, pappus 1.7-3.0 mm long, white, corollas 1.8-2.8 mm long, creamy-white or white, puberulous near the apices, the ligules erect or obliquely reflexed, 0.3-0.8 mm long, glabrous, achenes 0.7-1.4 mm long, 2-nerved, somewhat shiny, hispidulous or subglabrous; disk flowers 1-6, pappus 2.2-3.2 mm long, corollas 2.4-3.5 mm long, creamy-white or white, anthers sterile, achenes inane or apparently sometimes fertile; abnormal intermediate flowers sometimes present. Staminate Heads: 4.0-5.0 mm high, 2.5-4.0 mm wide, phyllaries 4-5 seriate; disk flowers 16-45, creamy white or white, pappus 2.0-3.0 mm long, white, tubes 1.0-1.8 mm long, puberulous above, limb 1.2-2.4 mm long, usually puberulous, lobes triangular, oblong or rarely linear, 0.7-1.3 mm long, sparsely puberulous or glabrous, style branches oblong or barely lanceolate, short-acuminate or acute, achenes abortive, inane or reduced to small knobs.

Chromosome number: n = 9 (Jackson, 1969), Fig. 1.

Pollen diameters (microns): polar, 16.0-19.4; equatorial, 16.7-21.0; Breedlove 7579, Hinton 8663, Jackson 1037, Jackson 1048.

Floral illustrations: Fig. 17.

Vernacular names: "Hierba del carbonero" was the name reported by Blake (1926, p. 1508) as applied in the Valley of Mexico. Further, "a decoction of the flowers is reported to be used as a remedy for catarrh." My study of the collections of this species did not reveal the source of Blake's information.

Archibaccharis serratifolia is a species which is extremely variable in its vegetative characteristics. The species may be distinguished by its dull stem which is noticeably pubescent with usually light-colored hairs for a considerable distance below the

inflorescences.

The present treatment of this species includes the name A. serratifolia var. paniculata as a synonym. Blake's (1924, p. 546) separation of two varieties of this species was justified by the amount of pubescence on stems and leaves as well as the harshness of the upper leaf surfaces. He regarded var. paniculata as a more "southern form" (Blake, 1924, p. 551). After my investigations of three populations in Mexico and Guatemala, little correlation was found between densely tomentose plants and upper leaf surfaces which were soft. In general, the older, lower leaves tend to become harsher, apparently with age. Herbarium studies also supported these observations. Plants from Mexico and Guatemala were often equally tomentose. Although extreme forms of this species appear quite distinct, no technical differences were found in floral structures. On the whole, it seems best to treat all specimens as belonging to a single species which is extremely variable in form and amount of pubescence.

Some populations of this species showed abnormal intermediate flowers on the pistillate heads.

From Chihuahua and Nuevo León, Mexico, extending to southern Guatemala (Fig. 20). The habitat of this perennial shrub has been described as on brushy slopes, in moist thickets, in pine, oak and fir forests, on dry exposures and rocky slopes, 384-2850 m ele.

GUATEMALA: Dept. Chimaltenango: San Martín, Chite Verde, Johnston 1767 (F); plains near Tecpán, above Tecpán, Skutch 759 (A, DS, MICH, US); Barranco de La Sierra, southeast of Patzún, Standley 61606 (F). Dept. Escuintla: no location, Aguilar 1759 (F); Morillo, Morales 885 (US). Dept. Guatemala: along F.D.R. Highway 21 km northwest of Guatemala City, Molina, Burger & Wallenta 15984 (F). Dept. Huehuetenango: no location, Skutch 1643 (A, F, NY, US); mountains west of Aguacatán, on the road to Huehuetenango, Standley 81324 (F); along road 13 km west of Huehuetenango, near Puente de Xinaxo, Standley 81483 (F). Dept. Jalapa: Volcán Jumay, north of Jalapa, Steyermark 32426 (F); between Jalapa and Montaña Miramundo, Steyermark 32876 (F). Dept. Quezaltenango: about 4 km north of Olintepeque, Williams, Molina & Williams 22860 (GH, NY). Dept. Quiché: pine forest of Pascual Abaj, west of Chichicastenango, Molina, Burger & Wallenta 16277 (F). Dept. Santa Rosa: Casillas, Heyde & Lux 4251 (F, GH, K). Dept. Sacatepéquez: Cerro de la Cruz, above Antigua, Jackson 1037 (F, G, GH, K, MIN, NY, P, US); slopes of Volcán de Agua, south of Santa María de Jesús, Standley 59496 (F, NY); Finca El Hato, northeast of Antigua, Standley 61232 (F, MICH); near Antigua, Standley 61752 (F, MICH); Cerro de la Cruz, above Antigua, Standley 63327 (F, GH). MEXICO: State of Chiapas: along road to Pinola, 2 km southwest of Aguacatenango, Municipio of Carranza, Breedlove 7922 (F, MICH); 3 miles south of Aguacatenango along road to Pinola Las Rosas, Municipio of Venustiano Carranza, Breedlove & Raven 13136 (DS, MICH); on trail from Zinacantán

Center to Ixtapa near Paraje Vo'bits, Municipio of Zinacantán, Laughlin 2405 (MICH); Mt. Pasitar, Matuda 0744 (MICH, MO). State of Chihuahua: Quicorichi, Río Mayo, Gentry 1999 (A, BM, F, K, MO); southwestern Chihuahua, Palmer 277 (GH, K, US); southwestern Chihuahua, Palmer 281 (BM, GH, K, NY, US). State of Durango: Espinazo, near the dedication monument, 20 miles east of the Sinaloa state line, Weber & Charette 11788 (MICH). Federal District: barranca near Santa Fe, Valley of Mexico, Bourgeau 1096 (C, G, GH, MSC, K, P, UC, US); Lomas de Mixcoac, Lyonnet 2992 (US); Angostura, Lyonnet 3417 (US); mountainside above Tlalpam, Pringle 11288 (GH, MICH, US); mountains above Eslaba, Pringle 11482 (C, F, GH, K, MO, US). State of Guanajuato: Cerro Grande, around San Diego, Municipio of Acámbaro, Rzedowski 21384 (MICH, MSC). State of Guerrero: Sierra Madre del Sur, Distrito Mina, second ridge west of Petlacala, Mexia 9053 (F, G, GH, K, MO, NY, UC); Carrizal, 9 km east of Camotla, Municipio of Chichihualco, Rzedowski 18031 (MICH, MSC, TEX); El Asoleadero, 15 km east of Camotla, Municipio of Chichihualco, Rzedowski 18059 (MICH, MSC, TEX). State of Hidalgo: Real Del Monte, El Sanate, Ehrenberg 401 (P). State of Jalisco: ca. 28 road miles west of Ayutla, and about 70 miles northwest of Autlán, Cronquist 9792 (MICH, NY, TEX, US); Sierra de Manantlán, 15-20 miles southeast of Autlán, near Aserrando El Cuartón, McVaugh 13852 (MICH); Río Blanco, Palmer 737 (GH, MO, NY, P); shaded canyons near Guadalajara, Pringle 2364 (BM, F, GH, K, MICH, MO, MSC, NY, P, UC, US); 5 km east of Rancho del Mortero, Municipio of Mezquitic, Rzedowski 17693 (MICH). State of Mexico: forest of San Nicholás, Bourgeau 969 (GH, K, P, US); Rancho San Lorenzo near town of Valle de Bravo, Dodds & Simpson 39 (MICH); Mesón Viejo, District of Temascaltepec, Hinton 2730 (BM, GH, K, US); District of Temascaltepec, Ocotepec, Hinton 2898 (BM, GH, K, MO, NY, US); 2.5 miles northeast of Temascaltepec, along Mexican Highway #130, Jackson 1048 (B, BM, C, F, G, GH, K, MICH, MIN, MO, MSC, NY, P, TEX, UC, US, WIS); Salto de Agua, Purpus 1502 (F, GH, MO, NY, UC US); Mt. Ixtaccihuatl, Purpus 1579 (F, GH, MO, NY, US); Valley of Mexico, Reiche 3 (US); Valley of Mexico, Schaffner 787 (K, P). State of Michoacan: Quinceo, vicinity of Morelia, Arsène 3241 (MICH, MO, P, US); Loma Santa María, vicinity of Morelia, Arsène 3646 (US); Cerro San Miguel, vicinity of Morelia, Arsène 5296 (MO, P, US); 5 miles north of Pátzcuaro, Cronquist 9725 (NY); Zitácuaro-Guanoro locality, Zitácuaro District, Hinton 13430 (G, K, MICH, NY, P, UC, US). State of Morelos: Sierra de Ocuila rumbo Mexicapa, Lyonnet 2857 (US). State of Nuevo León: Dulces Nombres and just east of border into Tamaulipas, Meyer & Rogers 2966 (BM, G, GH, K, MO, US). State of Oaxaca: mountain slopes near Tlaxiaco, trip into the Mixteca, Camp 2211 (NY); Sierra de San Felipe del Agua, north of Oaxaca, Jackson 1026 (B, BM, C, F, GH, K, MICH, MIN, MO, MSC, NY, P, UC, US, WIS); Sierra de Clavellinas, Smith 260 (MO, NY, UC, US). State of Puebla: barrancas near Hacienda Alamos, route to Vera Cruz, Arsène 2090 (MO, NY, US); Manzanilla, vicinity of Puebla,

Arsène & Nicolas 5491 (GH, MO, US); same location as the preceding, Nicolas s.n., P42170 (P). State of San Luis Potosi: Alvarez, Palmer 168 (BM, F, GH, MO, NSC, NY, UC); region of San Luis Potosi, Parry & Palmer 338 (BM, GH, K, MO, NY, UC); region of San Luis Potosi, Parry & Palmer 339 (BM, F, GH, K, MO, NY, P, US); Sierra de Alvarez, southeast of Calera, Rzedowski 5647 (NSC); San Luis Potosi, Schaffner 359 (BM, C, F, G, GH, MICH, NY, P, UC, US). State of Sinaloa: along route no. 40, 4 miles west of El Palmito, Powell & Edmonson 923 (MICH, TEX). State of Vera Cruz: Orizaba, Botteri 1106 (K); Orizaba, Botteri 1139 (K, P); Orizaba, Mohr 1114 (US); Orizaba, Müller 677 (P); Orizaba, Müller 1015 (NY, P); Orizaba, Schaffner 223 (GH, P). State of Zacatecas: Puerto de la Paja, 20 km to the west-southwest of Valparaiso, along the road to Huejuquilla, Rzedowski 17537 (MICH).

13. ARCHIBACCHARIS PENINSULARIS Blake, Journ. Washington Acad. Sci. 33: 267-268. 1943. Type: MEXICO: State of Baja California Sur: in small canyon in shade, rocky talus slopes under oaks, Arroyo Hondo, Sierra Giganta, ele. not given, 13 December 1938, Gentry 4120 (DS!; photo. MIN!; photo. and fragments, US!; isotypes: GH! MO! UC!).

Spreading, often pendent shrubs; 5-15 dm tall; above ground parts mostly hispidulous with whitish hairs; the subterranean parts and the bases not seen. Stems essentially straight, subterete, angled slightly by lines decurrent from the leaf bases, 1.0-4.0 mm in diam. above, the internodes 1.0-15.0 mm long, somewhat shiny, the main stems and older branches purple-brown or dark-purple, glabrescent below, thickly hispidulous above, the younger branches brown-green or green, thickly hispidulous. Leaves with petioles bearing decurrent, narrow margins which may or may not continue to the bases, 3.0-9.0 mm long, densely hispidulous below and on the margins; blades broadly elliptical or obovate, 2.0-5.0 cm long, 1.5-2.5 cm wide, chartaceous or thicker as in parchment, cuneate at bases, these continuing decurrently for varying distances on the petioles, obtuse, acute or sometimes emarginate at apices, margins distally often coarse-serrate, sometimes serrulate, hispidulous, upper surfaces dark-green, somewhat shiny, sparsely hirtellous with some hispidulous hairs or subglabrous, lower surfaces lighter green than the upper surfaces but dark, often as shiny as the upper surfaces, sparsely hispidulous. Panicles flat or convex on densely hispidulous peduncles. Pistillate Heads: ca. 5.0 mm high, 3.0 mm wide, phyllaries ca. 5-seriate, obtuse, the outer ones ovate or oblong-ovate and sparsely hirtellous on their bases, the inner ones oblong, oblong-ovate or just obovate, glabrous; filiform flowers 25-31, pappus 2.4-3.0 mm long, white, corollas 2.0-2.7 mm long, tubes white, the lobes or reduced lobes white but becoming purple or rosy at maturity, the tubes slender, puberulous above, the throats represented by a noticeably constricted, glabrous portion 0.6-0.8 mm long, the lobes nearly equally reduced and similar to

those of the disk flowers of the staminate heads, 0.4-0.6 mm long, nearly equal with little suggestion of zygomorphy, oblong or sometimes triangular, the apices thickly subglandular or with elongated setae, anthers present but completely vestigial within the tubes, style branches oblong, obtuse but sometimes short-acute, achenes 0.9-1.2 mm long, 0.4-0.5 mm wide, 2-3(-5) nerved. Staminate Heads: 5.0-5.5 mm high, 3.3-3.5 mm wide, phyllaries 4-5 seriate; disk flowers 5-20, tubes white, the lobes or reduced lobes white but becoming purple or rosy at maturity, pappus 2.5-2.8 mm long, white, tubes 1.2-1.8 mm long, glabrous except for a few nearly erect hairs near the apices, limb 1.3-2.2 mm long, puberulous, lobes linear or barely linear-lanceolate, 1.1-1.5 mm long, puberulous dorsally near the apices, style branches oblong or linear, short-acute or obtuse, achenes inane or apparently often fertile, 0.8-1.2 mm long, 2-3 nerved.

Pollen diameters (microns): polar, 16.0-20.0; equatorial, 17.8-22.8; Carter 5087, Carter 4761.

Floral illustrations: Fig. 19.

Blake (1943, p. 267) referred this plant to the genus Archibaccharis. The type collection, Gentry 4120, was composed solely of staminate plants with heads completely of normal disk flowers, a characteristic of the genus Baccharis as well as Archibaccharis. The nature of the habit and the thin leaves led Blake to place the plant in Archibaccharis.

Recent (1951-1967) collections of exceptionally fine specimens of A. peninsularis have been provided principally by Annetta Carter from the University of California. Through these collections, the first pistillate specimens and additional staminate specimens were made available for study.

Study of the heads of the available pistillate specimens has proven them to be different from any known taxon of Archibaccharis. These heads are composed completely of "intermediate" flowers. The tubes are slender as are the noticeably constricted throats which bear five reduced lobes. Vestigial anther sacs were found within the tubes and the achenes were fertile with 2-3(-5) nerves.

The disk flowers of the staminate heads contained functional anthers and apparently often fertile achenes. It does not seem impossible that some populations are composed solely of functionally staminate plants, a fact which might account for the completely staminate nature of all known sheets of the type collection. Carter & Moran 5367 (UC) from Cañada del Encinal was a collection of both pistillate and staminate plants, the achenes of the latter apparently fertile. The species appears to be subdioecious.

Because of the intermediate floral condition of the pistillate heads, number of achene nerves, apparent subdioecious nature of the species and general habit of the species, it is the author's opinion that this species should be retained in the genus Archibaccharis for the present.

known only from Baja California Sur in the Sierra de la Giganta

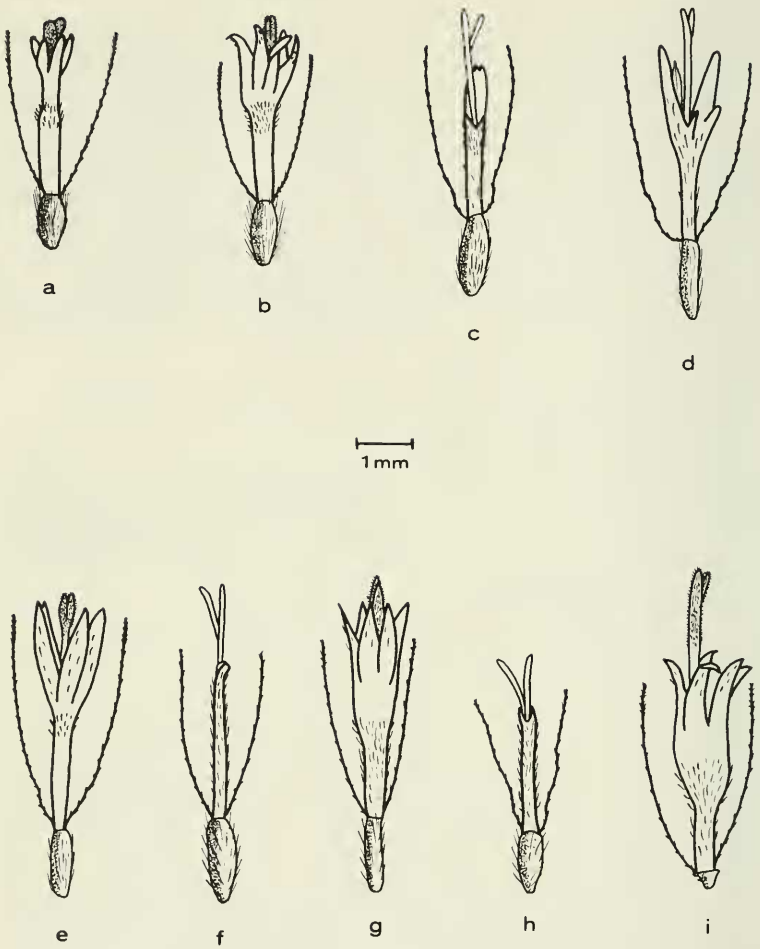


Fig. 19. Floral illustrations of Archibaccharis peninsularis, A. panamensis and A. irazuensis. A. peninsularis: pistillate heads: (a) filiform flower, vestigial stamens not shown, (Carter & Sousa 5183), (b) disk flower (Carter 5087). A. panamensis: (all from Allen 751): (c, d, e) pistillate heads: (c) filiform flower, (d) abnormal intermediate flower, (e) disk flower. A. irazuensis: (f, g) pistillate heads: (Standley & Valerio 43502): (f) filiform flower, (g) disk flower; staminate heads: (h) filiform flower (Williams & Molina 13865), (i) disk flower (Pittier 14078). Disk flowers are shown without anthers.

Fig. 20. Distribution of species of Archibaccharis in Mexico and Central America. Triangle, A. peninsularis. Circle, A. serratifolia.

region (Fig. 20). The habitat of this perennial shrub has been described mostly as on or near steep, rocky cliffs, steep slopes or on rocks, 400-111 m ele.

MEXICO: State of Baja California Sur: steep, north-facing slope, Cañada de Tripui southwest of Puerto Escondido, Sierra de la Giganta, Carter 4355 (UC); vicinity of Rancho Agua Escondido, in a canyon on the western slope of the Sierra de la Giganta a few miles from the crest, Carter 4761 (GH, MICH, UC); near base of lowest main cliffs on north-facing slope of Cerro Gabilán, south of Portezuelo de Gabilán, Carter 5087 (UC); on steep north-facing slope near crest of ridge, south of Valle de Los Enciños (south side of Cerro Giganta), Carter & Ferris 3996 (UC); Cañon del Cayuco, east base of Cerro de la Giganta, Sierra de la Giganta, Carter & Kellogg 3123 (BM, GH, MICH, UC); Cerro del Barreno, south side of Valle de Los Encinos (south side of Cerro Giganta). Carter & Moran 5334 (UC); Cañada del Encinal, south side of Valle de Los Enciños (south side of Cerro Giganta), Carter & Moran 5367 (BM, MICH, UC); steep, north-facing slopes near base of cliffs, southwest of El Aguaje, between Arroyo Hondo and Arroyo de las Palmas, northwestern slopes of Cerro Giganta, Carter & Sousa 5183 (UC).

14. ARCHIBACCHARIS PANAMENSIS Blake, Ann. Mo. Bot. Gard. 28: 472-474. 1941. Type: PANAMA: Province of Coclé, vicinity of El Valle, 100-800 m ele., 5 September 1938, Allen 751 (US!; photo., MIN! TEX!; isotype: GH!).

Erect ligneous herbs; ca. 15 dm tall; the subterranean parts and bases not seen. Stems essentially straight but perhaps obscurely fractiflex near the inflorescences, terete or sometimes slightly angled, 1.0-3.0 mm in diam. above, the internodes 1.5-4.5 cm long above, somewhat shiny, brown, pilosulous-villosulous above, the hairs sordid or brown. Leaves with short petioles, 1.0-3.0 mm long, puberulous below; blades elliptical-obovate or oblong-elliptical, 5.5-9.5 cm long, 2.0-3.0 cm wide, thinly chartaceous, cuneate at bases, short-acute or barely short acuminate at apices, margins distally denticulate, pilosulous, upper surfaces dark-green, dull, evenly puberulous with scattered subsessile glands, lower surfaces gray-green, dull, densely pilosulous with scattered subsessile glands. Panicles lax and loose on pilosulous-villosulous peduncles. Pistillate Heads: ca. 5.0 mm high, 2.5-3.0 mm wide, phyllaries ca. 4 seriate, acute or acuminate, the outer ones linear-subulate and entirely puberulous, the middle ones narrow and nearly linear, puberulous only near the apices, the inner ones narrow and nearly linear, glabrous; filiform ray flowers 18-24, pappus 3.0-3.2 mm long, white, corollas 2.5-2.8 mm long, white, densely puberulous near the apices, the ligules erect, 0.8-1.0 mm long, glabrous, achenes scarcely mature but presumably fertile, 1.5-1.6 mm long, 4-7 nerved, somewhat shiny, densely hirtellous; disk flowers 1-2, pappus ca. 3.6 mm long, corollas ca. 4.6 mm long, white, the throats nearly absent,

the expansion at that point gradual or abrupt by nearly a right-angle to the tubes, the lobes linear, ca. 1.8 mm long, sparsely puberulous on their dorsal surfaces, anthers sterile, style branches oblong or lance-oblong, acute, achenes inane. Staminate heads unknown.

Floral illustrations: Fig. 19.

Archibaccharis panamensis shares many characteristics with A. irazuensis from Costa Rica. However, the filiform corollas of A. panamensis have well-developed ligules when compared with those of A. irazuensis. The two species also differ in leaf characters. They have been collected at much different elevations.

The staminate specimen of A. panamensis is unknown. My examination of the apparently fertile achenes of the filiform ray flowers of the pistillate heads indicated 4-7 nerves. This character may tend to break down a usual distinction between Archibaccharis and Baccharis.

Abnormal intermediate flowers were found on the heads examined.

From Panama, known only by a single collection from the type locality (Fig. 21). There were no ecological notes on the collector's label other than the ele., 100-800 m.

Two specimens from the type collection were the only ones available for study.

15. ARCHIBACCHARIS IRAZUENSIS Blake, Journ. Washington Acad. Sci. 17: 60. 1927. Hemibaccharis irazuensis Blake, Contr. U. S. Nat. Herb. 20: 551. 1924. Type: COSTA RICA: Prov. San José: Laguna del Reventado, Volcán de Irazú, 2300 m ele., 1 January 1901, Pittier 14079 (US!; photo. MIN!; isotypes: F! G! GH! US!).

Erect ligneous herbs(?); ca. 10-20 dm tall; the subterranean parts and the bases not seen. Stems essentially straight but sometimes obscurely fractiflex above, terete, 1.0-4.0 mm in diam. above, the internodes 3.0-11.5 mm long above, purple or sometimes brown, somewhat shiny, glabrescent below, quite densely sordid-pilosulous above. Leaves subsessile or the petioles 2.0-7.0 mm long, sordid-pilosulous; blades lance-ovate, lance-elliptic, ovate or elliptic, 5.0-12.5 cm long, 1.5-3.5 cm wide, chartaceous, sometimes thickly so, cuneate or obtuse at bases, long-acuminate at apices, rarely subacute, margins distally serrulate or denticulate, rarely completely entire, sordid-pilosulous with some hispidulous hairs, upper surfaces dark-green, dull, sordid-pilosulous with some hispidulous hairs, lower surfaces lighter green, dull, sparsely pilosulous. Panicles convex on rather flat on sordid-brown, pilosulous peduncles. Pistillate Heads: 6.0-7.0 mm high, 3.0-5.0 mm wide, phyllaries ca. 5-seriate, acute or acuminate, the outer ones oblong-lanceolate and puberulous, the inner ones linear-lanceolate and becoming glabrous; filiform ray flowers 32-48, pappus 2.9-3.9 mm long, brown-tinged, corollas 2.4-2.8 mm long, white, puberulous nearly to the bases, the ligules erect, 0.2-0.4 (-0.8) mm long, puberulous, achenes 1.0-1.8 mm long, 2(-3) nerved;

disk flowers (0-)4-5, white, pappus 2.7-3.8 mm long, corollas (1.0-)3.6-4.0 mm long, white, anthers sterile, achenes abortive, inane or reduced to small knobs. Staminate Heads: 5.0-7.0 mm high, 4.0-5.0 mm wide, phyllaries ca. 4-5 seriate; filiform ray flowers occurring sporadically, 0-7, pappus 2.4-3.2 mm long, corollas often reduced, 1.6-2.2 mm long, white, achenes perhaps sometimes fertile; disk flowers 20-33, white, pappus 3.5-4.5 mm long, brown-tinged, tubes 1.2-1.8 mm long, puberulous, limb 2.1-3.2 mm long, puberulous, lobes oblong or triangular, 1.0-1.4 mm long, sparsely puberulous on the dorsal surfaces, style branches linear, acute, achenes abortive, inane or reduced to small knobs.

Pollen diameters (microns): polar, 16.7-21.0; equatorial, 18.9-23.3; Pittier 14078, Pittier 14079.

Floral illustrations: Fig. 19.

This species is perhaps closely related to A. panamensis but is distinguished by its larger pubescence, floral morphology and leaf characters. A. asperifolia bears some superficial resemblance to the present species, especially in its purple stem and rough upper leaf surface.

The staminate heads of the present species may sporadically possess a few filiform pistillate flowers on the edges of the staminate heads.

Pittier 14078 was collected at the same time and place as the type collection, Pittier 14079. It may have been intended that the pistillate plants belong to 14079 and the staminate plants to 14078. The holotype, Pittier 14079 (US) is a pistillate specimen.

From Cartago and San Jose, Costa Rica and Chiriqui, Panama (Fig. 21). The habitat of this species has been described as in moist, shady forests, on wet banks and on open hillsides, 1500-3000 m ele.

COSTA RICA: Prov. Cartago: at Cartago, Oersted 10.981 (C); Laguna del Reventado, Volcán Irazú, Pittier 14078 (F, GH, US); slopes of Volcán Irazú around Hotel Robert, Williams & Molina 13865 (GH, MO). Prov. San José: Río Burris, southern slope of Volcán de Irazú, Standley 35404 (US); Las Nubes, Standley 38396 (US); Cerro de las Vueltas, Standley & Valerio 43502 (GH, US). PANAMA: Prov. Chiriquí: open hillside, Volcán de Chiriquí, Davidson 991 (F, GH, US).

Fig. 21. Distribution of species of Archibaccharis in Central America. Square, A. irazuensis. Circle, A. panamensis.

Section II. Archibaccharis Section Hirtella J. D. Jackson, sec. nov.

Fruticibus subscandentibus vel vineis scandentibus caulibus vulgo fractiflexus vel raro volubilibus.

Subscandent shrubs or scandent vines, the stems usually noticeably fractiflex or if twining, fractiflex at least in the branchlets.

Taxa in this section occur from Nayarit and Hidalgo, Mexico to Dept. Chiriquí, Panama.

Type species: Archibaccharis hirtella (DC.) Heering.

Key to the Taxa in Section Hirtella

A. Plants subscandent; leaves sessile with green petioliform portions, the bases auriculate-amplexicaul; stems noticeably fractiflex and angled

B. Lower cauline leaves usually widening abruptly (often nearly truncate) above the petioliform portions; upper leaf surfaces hispidulous; leaf apices usually long-acuminate; apices of the filiform corollas of the pistillate heads with ligules 0.5-1.0 mm long with rather well-developed adjacent teeth; southern Chiapas, Mexico to Dept. Sacatepéquez, Guatemala . . . . . 16. A. Blakeana

BB. Lower cauline leaves widening more gradually above the petioliform portions; upper leaf surfaces hirtellous; leaf apices short-acuminate; apices of the filiform corollas of the pistillate heads with minute ligules and adjacent teeth, these difficult to discern even with magnification; known only from Oaxaca, Mexico . . . . . 17. A. Pringlei

AA. Plants scandent; leaves with definite petioles, even though sometimes short; stems fractiflex or twining, angled or terete

C. Leaves coriaceous or thickly chartaceous, subglabrous, upper and lower surfaces shiny, the hairs sparse on the midribs and veins

D. Pistillate heads 5.0-6.4 mm high, staminate heads 3.5-4.5 mm high; pappus brown-tinged or red-brown; Vera Cruz, Mexico and Dept. Alta Verapaz, Guatemala . . . . . 18. A. salmeoides

DD. Pistillate heads 7.0-8.0 mm high, staminate heads 5.5-6.5 mm high; pappus white; Honduras . . . . . 19. A. lucentifolia

CC. Leaves thinner in texture, membranaceous to thickly chartaceous, rarely subglabrous, pubescent between the veins on the upper and lower surfaces although sometimes sparsely so, rarely shiny on either leaf surface

E. Main stems usually sharply fractiflex; pistillate heads 3.5-5.5 mm high, staminate heads 3.0-6.0(-7.0) mm high, mature disk flowers of both pistillate and staminate heads cream, whitish, green-white or green-white becoming purple at maturity

F. Plants slender, older stems not deeply sulcate; leaves elliptical, variously ovate or lanceolate and obtuse or attenuate at bases; glands on leaf surfaces stalked if present; style branches of disk flowers usually rhombic-oblong and acute or acuminate, at least not oblong or linear

G. Stem pubescence eglandular

H. Stem pubesence above distinctly brown or sordid; pilose or pilosulous . . . . 20. A. hirtella var. taeniotricha

HH. Stem pubesence above whitish or with only a suggestion of brown; pilose or pilosulous

I. Leaves usually elliptical but sometimes oblong-ovate or ovate and acuminate or just acute at apices; lower leaf surfaces evenly stipitate-glandular and sparsely pilosulous, the glands amber; Oaxaca, Mexico . . . . 20a. A. hirtella var. albescens

II. Leaves usually ovate and long-acuminate at apices; lower leaf surfaces lacking stipitate amber glands, pilosulous with perhaps some hirtellous hairs; Vera Cruz, Mexico . . . 20b. A. hirtella var. intermedia

GG. Stem pubescence glandular . . . . . 20c. A. hirtella var. hirtella

FF. Plants stout, older stems often deeply sulcate, becoming hollow in pith region; leaves chiefly broadly ovate and cuneate, cuneate-rounded or subobtuse at bases and usually with scattered superficial amber or whitish glands on both surfaces; style branches of disk flowers oblong or linear, acute . . . . . 21. A. Schiedeana

EE. Main stems twining, the striations usually appearing twisted, sordid-brown or dark-brown; heads somewhat larger, pistillate heads 5.5-7.0 mm high, staminate heads 5.0-7.5 mm high; flowers white, green-white light-cream or rarely with a suggestion of pink; style branches linear or rarely oblong . . . . . 22. A. flexilis

16. ARCHIBACCHARIS BLAKEANA Standl. & Steyerm., Field Mus. Bot. 22: 296-297. 1940. Type: GUATEMALA: Dept. Sacatepéquez: near Antigua, brushy slope, 1500-1600 m ele., November 1938-February 1939, Standley 58597 (F!; photo. MIN!; isotype: GH!).

Subscandent shrubs; ca. 15-30 dm tall; above-ground parts with whitish or brown pubescence; roots fibrous. Stems fractiflex, obtusely 4-5 angled below, the younger portions subterete or sometimes sharply angled, flexuous, glaucescent, the bases ca. 7.0 mm in diam., graduating to 2.0-4.0 mm above, the internodes 1.0-10.0 cm long, somewhat shiny, gray-green below, red-brown or gray above, glabrescent below, villosulous above. Leaves sessile, the narrow petioliform portions 2.0-10.0 mm wide, often lacking on immature leaves; blades often widening abruptly on the older cauline leaves, sometimes widening gradually below the middle especially on younger leaves, ovate, oblong-ovate or broadly ovate, rarely orbicular, 5.5-15.5 cm long, (2-)4.0-8.5 cm wide, thinly chartaceous, auriculate-amplexicaul at bases, usually long-acuminate at apices, sometimes falcate, margins distally serrate, undulate or merely denticulate, hispidulous, upper surfaces dark-green, dull, sparsely hispidulous, lower surfaces lighter green, dull, subglabrous with some hispidulous and villosulous hairs. Panicles convex on villosulous peduncles. Pistillate Heads: 4.0-6.0 mm high, 3.0-5.0 mm wide, phyllaries 5-6 seriate, acute, the outer ones narrowly triangular or oblong and sometimes puberulous along their entire length, the middle ones linear-lanceolate and puberulous near their apices, the inner ones linear-lanceolate, glabrous; filiform ray flowers 30-53, pappus 2.9-3.3 mm long, white, corollas 3.0-3.3 mm long, green-white, finely and sparsely puberulous, the ligules short, 0.5-1.0 mm long, usually with a central, larger tooth, the ligular sinuses often bear 1-2 separate or fused lateral, long, erect, linear or subulate lobes, these not exceeding the ligules, achenes 1.2-1.4 mm long, 2-3 nerved, shiny and usually finely and sparsely hispidulous; disk flowers 1-3, pappus 2.9-3.8 mm long, corollas 3.4-3.8 mm long, green-white, anthers sterile, achenes abortive, reduced to small knobs. Staminate Heads: 4.0-6.0 mm high, ca. 4.0 mm wide, phyllaries 4-5 seriate; disk flowers 17-25, green-white, pappus 3.0-3.4 mm long, white, tubes 1.0-1.3 mm long, subglabrous, limb 2.1-3.2 mm long, subglabrous with antrorse hairs, lobes triangular or merely acute, 0.6-0.9 mm long and with a few scattered hairs on the dorsal surfaces, style branches linear or barely linear-lanceolate, long-acuminate or acute, achenes abortive, reduced to small knobs.

Chromosome number: n = 9 (Jackson, 1969), Fig. 2.

Pollen diameters (microns): polar, 16.7-20.5; equatorial, 18.9-23.3; Jackson 1036, Williams, Molina & Williams 22998.

Floral illustrations: Fig. 22.

Archibaccharis Blakeana is a weak-stemmed scrambler, dependent on adjacent plants for much of its support.

In most of the floral and vegetative characters as well as habit, A. Blakeana matches A. Pringlei from the state of Oaxaca,

Mexico, very closely. When one has both species in hand, they seem distinct although this is difficult to convey. The petioliform portion of the usually broader leaves of A. Blakeana are consistently narrower than those parts of the leaves from A. Pringlei, especially when upper leaves are compared. The basal portions of the leaf blades of the older cauline leaves (above the petioliform part) are often very wide and nearly truncate in A. Blakeana. These leaves of A. Pringlei narrow gradually to the petioliform portion by a more cuneate form. Also, when the leaf apices are compared, A. Pringlei presents a short-acuminate form in contrast to a long-acuminate form in A. Blakeana. The leaf texture is consistently thinner in A. Blakeana although both species have chartaceous leaves. They were described as "thickly" and "thinly" chartaceous. The pubescence may be helpful, being usually shorter, less dense and generally rougher to the touch on the upper leaf surfaces of A. Blakeana. The most useful distinguishing feature is perhaps found on the apices of the filiform corollas of the pistillate heads. The ligules and teeth are markedly better developed on A. Blakeana corollas when compared to those of A. Pringlei. There would seem to be a close genetic relationship between these species. In these species, the differences noted seem sufficient to justify the assumption of genetic isolation until this can be tested.

From Chiapas, Mexico and Chimaltenango, Quezaltenango and Sacatepequez, Guatemala (Fig. 23). A. Blakeana has been collected in moist woods, barrancas and thickets, 1500-3000 m ele.

GUATEMALA: Dept. Chimaltenango: Finca La Alameda, near Chimaltenango, Standley 59106 (F); same location as the preceding, Standley 79838 (F). Dept. Guatemala: 10 km south of San Raimundo, Standley 62895 (F). Dept. Quezaltenango: mountains above Río Samalá, 2 km west of Zunil, Williams, Molina & Williams 22998 (NY). Dept. Sacatepéquez: Cerro de la Cruz, Antigua, Jackson 1036 (A, B, BM, C, DS, F, G, GH, K, MICH, MIN, MO, MSC, NY, P, POM, TEX, UC, US, WIS); along road to Finca El Hato, above Antigua, Jackson 1038 (A, B, DS, F, G, GH, K, MICH, MIN, MO, NY, P, POM, TEX, US); above Pastores, Standley 60817 (F, GH, US); Finca El Hato, Standley 61197 (F); barranca above Dueñas, Standley 63227 (F). MEXICO: State of Chiapas: Mount Ovando, Matuda 0706 (MICH, US).

17. ARCHIBACCHARIS PRINGLEI (Greenm.) Blake, Contr. U. S. Nat. Herb. 23: 1508. 1926. Baccharis Pringlei Greenm., Proc. Amer. Acad. 41: 259-260. 1905. Hemibaccharis Pringlei (Greenm.) Blake, Contr. U. S. Nat. Herb. 20: 547. pl. 48. 1924. Type: MEXICO: State of Oaxaca: wet ravines, Sierra de San Felipe, 2285 m ele., 11 December 1895, Pringle 7014 (GH!; photo. MIN!).

Subscandent shrubs; ca. 30 dm tall; above-ground parts with white pubescence; roots fibrous. Stems fractiflex, terete or 5-angled, flexuous, glaucescent, the bases ca. 6.0 mm in diam., graduating to 2.0-3.0 mm above, the internodes 1.5-10.0 cm long,

somewhat shiny, dark-brown below, villosulous with some hirtellous hairs above. Leaves sessile, the petioliform portions 1.0-2.5 cm wide, often lacking on immature leaves; blades usually widening gradually below the middle on all cauline leaves, ovate, 4.0-14.0 cm long, 3.0-7.3 cm wide, thickly chartaceous, auriculate-amplexicaul at bases, short-acuminate at apices, margins distally serrate, hispidulous with some hirtellous hairs, upper surfaces dark-green, dull, quite evenly and somewhat densely hirtellous, sometimes finely arachnose as well, lower surfaces lighter green, dull, sparsely hirtellous and sometimes with fine arachnose hairs. Panicles convex on villosulous peduncles. Pistillate Heads: 6.0-6.5 mm high, ca. 4.0 mm wide, phyllaries 4-5 seriate, acute or rarely obtuse, the outer ones long-triangular, linear or barely linear-lanceolate and puberulous near the apices, the inner ones linear or linear-lanceolate and becoming glabrous; filiform ray flowers 35-40, pappus 2.7-3.3 mm long, white, corollas 3.2-3.7 mm long, green-white, sparsely puberulous above but sometimes to the bases, the ligules extremely minute with 2-3 upper teeth, usually with 2 smaller, shorter teeth adjacent to the ligular sinuses or sometimes with only one lower tooth, achenes 1.1-1.3 mm long, 2-nerved, shiny and hispidulous; disk flowers 1-3(-26), pappus 3.2-3.5 mm long, corollas 3.4-3.7 mm long, green-white, anthers sterile, achenes abortive, reduced to small knobs. Staminate Heads: 4.0-5.5 mm high, 4.0-5.0 mm wide, phyllaries 4-5 seriate; disk flowers 12-29, green-white, pappus 3.2-3.7 mm long, white, tubes 1.1-1.3 mm long, subglabrous, limb 2.2-2.9 mm long, subglabrous or very sparsely puberulous, lobes triangular, 0.6-0.9 mm long, the dorsal surfaces with a few hairs at their apices, style branches oblong-lanceolate or just oblong, long-acuminate, achenes abortive, reduced to small knobs.

Chromosome number: 2n = 18 (Jackson, 1969), Fig. 2.

Pollen diameters (microns): polar, 16.7-18.9; equatorial, 18.9-21.0; Jackson 1031.

Floral illustrations: Fig. 22.

Archibaccharis Pringlei is a weak-stemmed scrambler and its long distal portions are dependent upon other plants for support.

Jackson 1031 probably represents the first-known collection of the pistillate specimens of A. Pringlei. This species was first placed in the genus Baccharis by Greenman (1905) and then in the genus Archibaccharis by Blake (1926) on the basis of a single staminate specimen. These judgements were confirmed by the structure of the pistillate heads. A. pringlei is closely related to A. Blakeana from southern Mexico and Guatemala. The two species are identical in habit but differ somewhat in pubescence, leaf morphology and the structure of the pistillate corolla, cf. the discussion of A. Blakeana.

Although Sierra de San Felipe del Agua was ascended twice by the author via the eastern and western slopes, A. Pringlei was located in only one barranca on the western slope which is known locally as "Rincon de la Guerta," which literally means "corner

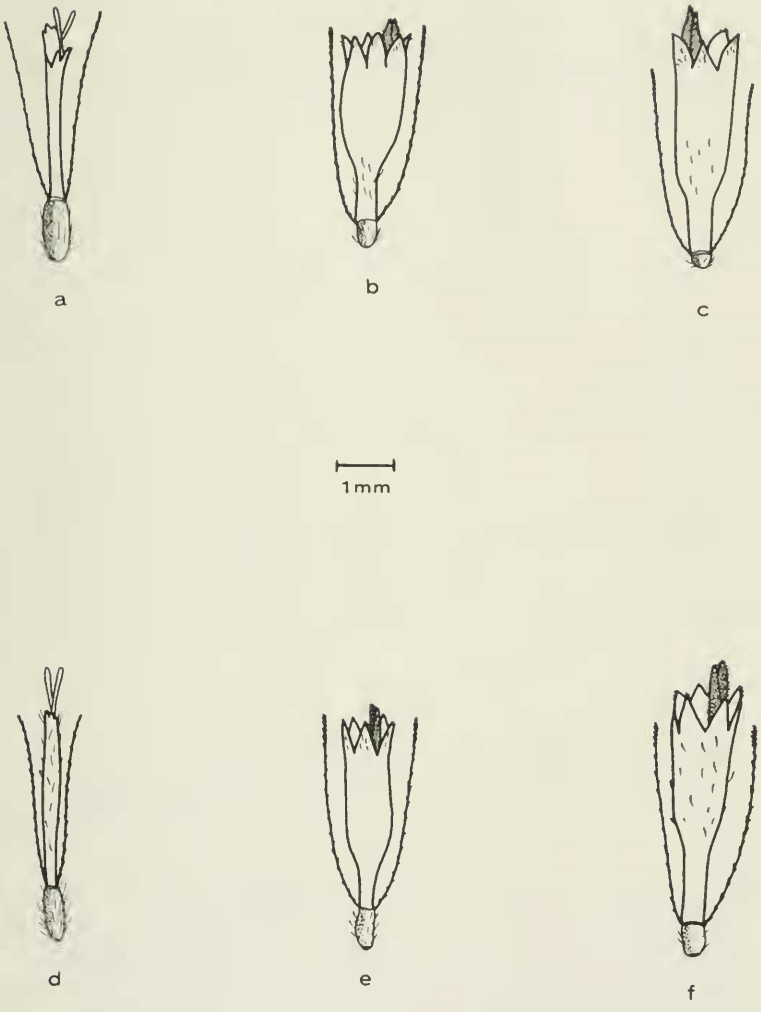


Fig 22. Floral illustrations of Archibaccharis Blakeana and A. Pringlei. A. Blakeana (all from Jackson 1036): (a, b) pistillate heads: (a) filiform flower, (b) disk flower; staminate heads: (c) disk flower. A. Pringlei (all from Jackson 1031: (a, b) pistillate heads: (d) filiform flower, (e) disk flower; staminate heads: (f) disk flower. Disk flower are shown without anthers.

Fig. 23. Distribution of species of Archibaccharis in Mexico and Guatemala. Circle, A. Blakeana. Triangle, A. Pringlei.

or narrow valley of the orchard."

Apparently the ratio of disk flowers to filiform ray flowers in the pistillate heads is quite variable. Extremes from 0-40 were found when the filiform ray flowers were counted. The disk flowers varied from 1-26. The variation was often great even when heads on the same plant were compared. In all cases, the achenes of the disk flowers appeared abortive and their anther sacs were sterile.

The achenes of A. Pringlei were germinated without difficulty in petri dishes at room temperature. Some plants were kept in flower pots (sterile potting soil) where they survived for several months with little growth in height. Others were transplanted to garden soil (June-September, Minnesota) in moist, shady conditions where they appeared healthy but grew little in height. These plants succumbed to the first frost conditions. It was the author's purpose to observe the development of the broad petioliform portion of the leaves. The seedlings possessed naked petioles devoid of the lateral green margin and only after some time did they develop the green petioliform part of the leaf which is so characteristic of this species.

Known only from the type location in Oaxaca, on Sierra de San Felipe del Agua, north of the city of Oaxaca (Fig. 23). This perennial shrub was collected in a shaded, moist barranca and in adjacent drier, exposed areas, 2100-2285 m ele.

MEXICO: State of Oaxaca: Sierra de San Felipe del Agua, Jackson 1031 (A, B, BM, C, DS, F, G, GH, K, MICH, MIN, MO, MSC, NY, P, POM, TEX, UC, US, WIS).

18. ARCHIBACCHARIS SALMEOIDES Blake, Journ. Washington Acad. Sci. 17: 61. 1927. Hemibaccharis salmeoides Blake, Contr. U. S. Nat. Herb. 20: 548. pl. 50. 1924. Type: GUATEMALA: Dept. Alta Verapaz: Cobán, 1350 m ele., February 1907, von Türckheim II 1641 (US!; photo. MIN! UC!; isotypes: C! G! GH! US!).

Scandent vines; height unknown; above-ground parts brown-pubescent where hairs are present; subterranean parts and the bases not seen. Stems fractiflex but not sharply so, terete, 1.0-5.0 mm in diam. above, the internodes 0.7-12.0 cm long, somewhat shiny, brown or gray-brown, glabrescent below, hirtellous with some pilosulous hairs above. Leaves with petioles 2.0-13.0 mm long, pilosulous with a few hirtellous hairs; blades narrowly or broadly elliptic, lance-elliptic, barely lance-ovate or more broadly ovate, 5.0-9.0 cm long, 1.5-6.0 cm wide, thickly chartaceous or coriaceous, cuneate or obtuse at bases, long or short-acuminate at apices, margins subentire or distally denticulate, subglabrous, upper surfaces dark-green, shiny, subglabrous, lower surfaces lighter green than the upper surfaces but dark, shiny but duller than the upper surfaces, subglabrous or rarely with scattered pilosulous hairs. Panicles rounded or sometimes pyramidal on peduncles bearing hirtellous and sometimes

pilosulous hairs. Pistillate Heads: 4.0-6.4 mm high, 3.0-4.0 mm wide, phyllaries ca. 5-seriate, acute, the outer ones ovate becoming lance-ovate and sometimes pilosulous, the inner ones linear-lanceolate and glabrous; filiform ray flowers 8-22, pappus 3.0-4.0 mm long, brown-tinged or red-brown, the regular bristles often mixed with short, hyaline setae, corollas 2.6-2.9 mm long, probably whitish to yellow-brown below but tipped with pink or purple, puberulous above, the ligules sometimes greatly reduced, 0.2-0.7 mm long, achenes 1.0-1.9 mm long, 3(-4) nerved, somewhat shiny and hispidulous; disk flowers 1-4, pappus 3.4-3.6 mm long, corollas 3.9-4.4 mm long, probably whitish to yellow brown below, the lobes tipped with pink to purple, anthers sterile, achenes abortive, stipitiform or reduced to small knobs. Staminate Heads: 3.5-4.0 mm high, ca. 3.5 mm wide, phyllaries ca. 4-seriate; disk flowers ca. 24, probably whitish to yellow-brown below, the lobes tipped with pink to purple, pappus 1.9-2.4 mm long, brown-tinged or red-brown, the regular bristles often mixed with short, hyaline setae, tubes 1.2-1.8 mm long, thickly puberulous to the bases, limb 1.5-1.9 mm long, puberulous mostly below, lobes barely elliptic or lance-ovate, the bases usually narrower than the broadest point of the lobes, 1.2-1.4 mm long, the apices sparsely puberulous, style branches rhombic-oblong, lance-elliptic or rarely subclavellate, short-acute, achenes abortive, reduced to small knobs.

Pollen diameters (microns): polar, 17.5-21.0; equatorial, 19.5-23.0; Linden 1132.

Floral illustrations: Fig. 24.

Archibaccharis salmeoides resembles A. lucentifolia from Honduras quite closely. The two species perhaps differ in habit, especially dependency for support, but this remains to be verified. The heads, phyllaries and flowers of A. salmeoides are smaller than those of A. lucentifolia. The morphology of the disk flowers appears to differ consistently. In addition, the terminal branchlets are sharply fractiflex in the Honduran species while only slightly so in the few available collections of A. salmeoides. Color differences also exist which may or may not prove to be reliable.

The type collection of A. salmeoides, von Türckheim II 1641, was actually a mixed collection. That number, as represented by specimens from the F, MICH and MO Herbaria is A. Schiedeana. Further, von Türckheim II 1404, cited below, is also A. Schiedeana as represented in the Gray Herbarium.

The staminate specimens of A. salmeoides may now be described for the first time. Old, previously unidentified collections by Linden and Galeotti from Vera Cruz, Mexico proved to be of this species and provided both pistillate and staminate material.

Known only from the type location, Cobán, Guatemala and now from Vera Cruz, Mexico (Fig. 25). It is presumed that this species may be found in the moist woods surrounding Cobán, Guatemala (author visit). The Linden and Galeotti collections from Vera Cruz, Mexico had no ecological notes except 1350-3000 m ele.

GUATEMALA: Dept. Alta Verapaz: Cobán, von Türckheim II 1404, in part (BM); von Türckheim II 1657 (G, NY); Cobán, von Türckheim 4159 (GH). MEXICO: State of Vera Cruz: peak of Orizaba, Galeotti 2179 (G); Cordillera, Vera Cruz, Galeotti 2321 (G, P); Tototsinapa, Linden 1132 (G, K, P).

19. ARCHIBACCHARIS LUCENTIFOLIA L. Wms., Fieldiana 29(7): 388-389. 1962. Type: HONDURAS: Dept. Morazán, 2000 m ele., 25 March 1951, Williams & Williams 17497 (F!; photo. MIN!; isotypes: GH! US!).

Scandent vines; height unknown; above-ground parts mostly brown-pilosulous but usually with some white-tomentulose and villosulous hairs where hairs are present; subterranean parts and the bases not seen. Stems fractiflex, the branchlets strongly so, terete, 1.5-3.0 mm in diam. above, the internodes 1.0-6.0 cm long above, barely shiny, red-purple, sometimes green or gray-brown, glabrescent below, pilosulous and often with tomentulose hairs mixed with some villosulous hairs above. Leaves with petioles 2.0-8.0 mm long, pilosulous; blades ovate, elliptic, oblong-elliptic or lance-elliptic, 3.0-12.0 cm long, 3.0-4.5 cm wide, coriaceous, cuneate or somewhat rounded at bases, acuminate or acute at apices, margins entire, distally denticulate or serrulate, upper surfaces dark-green, shiny, subglabrous with some tomentulose and pilosulous hairs, lower surfaces lighter green than the upper surfaces but dark, somewhat shiny, sparsely pubescent. Panicles convex on peduncles with mostly pilosulous peduncles, these hairs often mixed with tomentulose and villosulous pubescence. Pistillate Heads: 7.0-8.0 mm high, ca. 4.0 mm wide, phyllaries ca. 5-seriate, mostly obtuse or sometimes acute, the outer ones ovate or ovate-oblong and essentially glabrous, the inner ones linear-lanceolate and glabrous; filiform ray flowers 10-14, pappus 4.4-4.6 mm long, white, corollas 3.1-3.7 mm long, white below but tipped with purple, thickly puberulous near the apices, the ligules erect, 0.3-0.6 mm long, glabrous, achenes 1.0-1.5 mm long, 3-nerved, barely shiny and hispidulous; disk flowers 2, pappus ca, 4.2 mm long, corollas 4.0-5.4 mm long, white below but the lobes becoming purple, anthers sterile, achenes abortive, inane or stipitiform. Staminate Heads: 5.5-6.5 mm high, 3.5-4.0 mm wide, phyllaries ca. 5-seriate; disk flowers ca. 12, white below but the lobes becoming purple, pappus 3.6-4.0 mm long, white, tubes 2.0-2.5 mm long, puberulous below, limb 2.0-3.0 mm long, puberulous below, lobes triangular, rarely two are fused nearly to their bases, 1.6-2.2 mm long, the apices finely puberulous, style branches clavellate or nearly oblong, acute or short-acuminate, achenes abortive, reduced to small knobs.

Pollen diameters (microns): polar, 25.5-32.1; equatorial, 28.9-35.5; Williams, Molina, Burger & Wallenta 17004, Williams & Molina 13732.

Floral illustrations: Fig. 24.

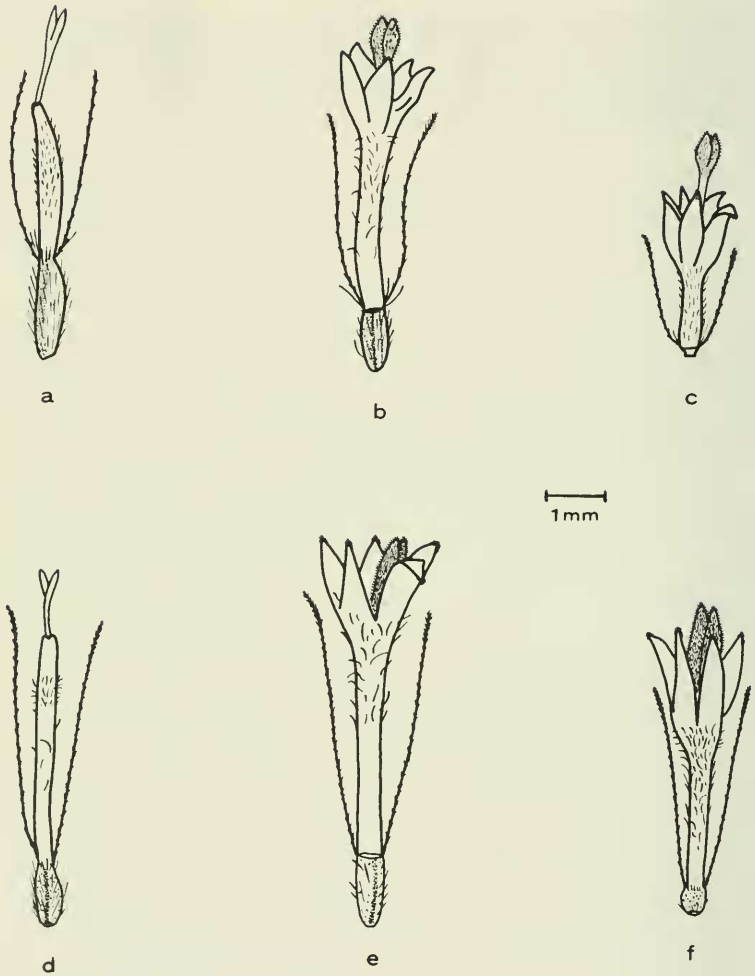


Fig. 24. Floral illustrations of Archibaccharis salmeoides and A. lucentifolia. A. salmeoides: (a, b) pistillate heads (von Turckheim 1641); (a) filiform flower, (b) disk flower; staminate heads: (c) disk flower (Linden 1132). A. lucentifolia: (d, e) pistillate heads (Molina, Williams, Burger & Wallenta 16990); (d) filiform flower, (e) disk flower; staminate heads: (f) disk flower (Williams, Molina, Burger & Wallenta 17004). Disk flowers are shown without anthers.

Fig. 25. Distribution of species of Archibaccharis in Mexico and Central America. Circle, A. salmeoides. Triangle, A. lucentifolia.

Vernacular names: "Amargoso" in Dept. Morazán, Honduras.

Archibaccharis lucentifolia strongly resembles A. salmeoides from Guatemala and Mexico in its vegetative characters. They differ somewhat in the pubescence of the upper branches and peduncles. Consistent distinctions are found in the heads and floral characters. A. salmeoides is perhaps a stouter plant. Additional collections of both species are needed.

In the original description of A. lucentifolia, Williams (1962, p. 388) cited a Williams & Molina collection without number as the type. Dr. Williams has confirmed that an oversight did occur in his publication (personal communication). The type collection is correctly Williams & Williams 17497, the holotype housed at the Field Museum, Chicago. Apparently a recording error occurred on the US isotype as it was dated "25 March 1961." The holotype is dated "25 March 1951."

Williams (1962, p. 388) referred von Türckheim II 1164 (US) to A. lucentifolia L. Wms. Because that collection number is unknown to the author and von Türckheim II 1641 (US) was annotated as "A. lucentifolia L. Wms.," the latter number appears to be the one Dr. Williams intended to cite, a specimen properly referred to A. salmeoides. In fact, von Türckheim II 1641 is the type collection of A. salmeoides.

Known only from the type locality (Fig. 25). This scandent vine has been collected in wet cloud forest on Mountain La Tigre and adjacent mountains above San Juancito, 1800-2100 m ele.

HONDURAS: Dept. Morazán: on mountain La Tigre, southwest of San Juancito, Molina, Williams, Burger & Wallenta 16990 (F, NY); same location as the preceding, Molina, Williams, Burger & Wallenta 17004 (BM, F, GH, NY); on mountain La Tigre, between Jutiapa and Quebrada La Tigre, southeast of San Juancito, Molina 20289 (BM); in San Juancito Mountains above San Juancito, Williams & Molina 13732 (BM, F, GH, US).

20. ARCHIBACCHARIS HIRTELLA (DC.) Heering var. TAENIOTRICHA Blake, Journ. Washington Acad. Sci. 24: 434. 1934. Type: GUATEMALA: Dept. Chimaltenango: cypress woods, Santa Elena, 2400-2700 m ele., 24 February 1933, Skutch 276 (US!; photo. MIN!; isotypes: A! DS! MICH!).

Scandent vines; ca. 30-60 dm tall; above-ground parts sordid or brown-pilosulous, the hairs spreading; roots fibrous. Stems usually fractiflex, terete but sometimes angled, the bases 5.0-10.0 mm in diam., graduating to 1.0-4.0 mm above, rather slender, the internodes 1.0-6.0 cm long, gray-brown or brown below, brown above, glabrescent below, becoming thickly pilosulous above. Leaves with short petioles, 1.0-8.0 mm long, pilosulous; blades ovate, oblong-ovate or elliptical, 2.5-10.5 cm long, 1.5-4.0 cm wide, thickly chartaceous, chartaceous or submembranaceous, obtuse at bases, acuminate or just acute at apices, margins distally serrate, serrulate or merely denticulate, pilosulous, with some hispidulous hairs, upper surfaces dark-green,

shiny, often densely pilosulous with some hispidulous hairs, sometimes sparsely so, lower surfaces dark-green, pilosulous but usually with some hirtellous hairs. Panicles rather loose and small on densely pilosulous peduncles. Pistillate Heads: 4.5-5.5 mm high, 2.0-2.5 mm wide, phyllaries ca. 5-seriate, acute, the outer ones lanceolate and pilosulous, the inner ones linear-lanceolate, essentially glabrous or sparsely pilosulous; filiform ray flowers 10-18, pappus 2.7-3.3 mm long, brown-tinged or white, corollas 1.9-2.8 mm long, green-white becoming dark-purple especially above at maturity, puberulous above, the ligules erect, 0.3-0.6 mm long, glabrous, achenes 0.8-1.5 mm long, 3-4 nerved, shiny and finely hispidulous; disk flowers 1-2, pappus 2.6-3.6 mm long, corollas 3.0-3.9 mm long, green-white becoming purple especially above at maturity, anthers sterile, achenes abortive, inane. Staminate Heads: 3.0-4.5 mm high, 2.0-2.5 mm wide, phyllaries ca. 4-seriate; disk flowers 15-25, green-white becoming purple especially above at maturity, pappus 1.4-2.8 mm long, brown-tinged or white, tubes 1.4-2.0 mm long, puberulous above, limb 1.2-2.2 mm long, puberulous especially below, lobes oblong or barely linear, 0.9-1.3 mm long, the dorsal surfaces glabrous or rarely sparsely puberulous, style branches rhombic-oblong or subclavellate, shortly acuminate or acute, achenes abortive, reduced to small knobs.

Chromosome number: n = 9 (Jackson, 1969), Fig. 2.

Pollen diameters (microns): polar, 16.7-21.0; equatorial, 17.8-22.2; Jackson 1042, Steyermark 43081.

Floral illustrations: Fig. 26.

Archibaccharis hirtella var. taeniotricha is closely related to A. hirtella var. hirtella and its varieties, var. intermedia and var. albescens. These taxa are very similar in habit and floral morphology. Future studies may more fully justify the elevation of each of these varieties to species status. I suspect they may represent distinct biological entities.

A. hirtella var. taeniotricha is distinguished by its densely brown-pilosulous stems and leaves bearing eglandular hairs. Two collections cited by Blake (1934, p. 434) as A. hirtella var. taeniotricha have been cited in this paper as representing a new taxon, A. hirtella var. albescens. Pringle 4988 and Smith 259 from Sierra de Clavellinas, Oaxaca as well as my own collection from Sierra de San Felipe del Agua, Oaxaca belong to this new variety which is distinguished from Blake's var. taeniotricha by the presence of glandular hairs on the under leaf surfaces and the color of the stem pubescence.

Skutch's notes on the label of the type collection indicated that this species is "sometimes epiphytic and rooted on moss-covered trunks." This condition was not observed by the author when a collection was made at the type location or in an El Salvador population.

From Chiapas, Mexico; Chimaltenango, Guatemala, El Progresso, Jalapa, Quezaltenango, San Marcos and Solola in Guatemala as well as San Salvador, El Salvador (Fig. 27). The habitat of this

climbing vine has been variously described as on moist, wooded slopes, in thickets, in ravines and in cloud forests, 1200-3800 m ele.

EL SALVADOR: Dept. San Salvador: Volcán San Salvador, from Finca Las Brumas to the peak of the volcano, Carlson 460 (F, UC). GUATEMALA: Dept. Chimaltenango: Santa Elena on Cerro de Tecpán, Jackson 1042 (B, BM, C, F, G, GH, K, MICH, MIN, MO, MSC, NY, P, UC, US); Santa Elena, Skutch 769 (K); region of Los Positos, above Las Calderas, Standley 80177 (F, G). Dept. Guatemala: Lake Amatitlán, Kellerman 5313 (F); Volcán Pacaya, Kellerman 6363 (F, US). Dept. El Progresso: near summit, between Calera and summit of Volcán Siglo, Steyermark 43081 (F, NY); hills between Finca Piamonte and slopes southeast of Finca Piamonte, Steyermark 43392 (F, NY). Dept. Jalapa: Volcán Jumay, north of Jalapa, Steyermark 32345 (F); around waterfall, Montana Miramundo, Steyermark 32841 (F, GH). Dept. Quezaltenango: between Santa María de Jesús, Los Majadas and summit of volcano, Volcán Santa Maria, Steyermark 33972 (F). Dept. San Marcos: along road between San Sebastián at km 21 and km 8, 8-18 miles northwest of San Marcos, Steyermark 35660 (F); along Quebrada Canjulá, Volcán Tacaná, Steyermark 36041 (F, MICH). Dept. Solola: near Nahualá, Sierra Madre Mountains, Williams, Molina & Williams 23186 (NY). MEXICO: State of Chiapas: near Zinacantán, Laughlin 2239 (DS, MICH); ridge north of Clinica Yerba Buena near Pueblo Nuevo Solistahuacan, Municipio of Pueblo Nuevo Solistahuacan, Raven & Breedlove 19985 (MICH); in Paraje Shohleh, Municipio of Tenejapa, Ton 560 (MICH, NY).

20a. ARCHIBACCHARIS HIRTELLA (DC.) Heering var. ALBESCENS J. D. Jackson, Phytologia 28(3): 298-300. Fig. 1. 1974. Type: MEXICO: State of Oaxaca: oak woods, Sierra de Clavellinas, 2812 m ele., 18 October 1894, Pringle 4988 (MIN!; isotypes: BM! G! GH! K! MICH! MO! MSC! NY! P! POM! UC!).

Known only from Oaxaca, Mexico (Fig. 27). This variety is a scandent vine closely allied with Archibaccharis hirtella (DC.) Heering var. taeniotricha Blake.

Ca. 50-70 dm tall, sordid-pilosulous hairs below becoming whitish above on the branches and leaves; leaves elliptical but sometimes oblong-ovate or ovate, 3.5-6.5 cm long, 1.0-2.5 cm wide, acuminate or just acute at apices, the lower surfaces pilosulous and rather evenly stipitate-glandular; panicles small and close, the pistillate heads 3.5-4.0 mm high, the staminate heads 3.5-4.0 mm high, the phyllaries glabrous.

The specific epithet "albescens" refers to the sordid hairs on the lower parts of the plant which become whitish above.

Chromosome number: n = 9 (Jackson, 1969), Fig. 2.

Pollen diameters (microns): polar, 15.0-20.0; equatorial, 16.7-21.0; Jackson 1025, Smith 259.

Floral illustrations: Fig. 26.

20b. ARCHIBACCHARIS HIRTELLA (DC.) Heering var. INTERMEDIA Blake, Journ. Washington Acad. Sci. 24: 434. 1934. Type: MEXICO: State of Vera Cruz: shaded banks near Orizaba, 1313 m ele., 25 January 1895, Pringle 6108 (US!; photo. MIN!; isotypes: BM! C! F! GH! K! MICH! MIN! MO! MSC! NY! P! POM! UC!).

Scandent vines(?); ca. 6-15 dm tall; above-ground parts brownish-pilosulous, the hairs spreading; the subterranean parts and the bases not seen. Stems essentially straight but sometimes obscurely fractiflex, terete, 0.5-3.0 mm in diam. above, the internodes 0.5-5.0 cm long above, somewhat shiny, brown-purple becoming brown then green on the branches and branchlets, glabrescent below, pilosulous or minutely pubescent above. Leaves with short petioles, 2.0-4.0 mm long, pilosulous, blades usually quite broadly ovate, 2.5-5.0 cm long, 1.5-3.0 cm wide, chartaceous, obtuse or subcordate at bases, usually long-acuminate but sometimes long-acute and often falcate at apices, margins distally serrate, serrulate or merely denticulate except for entire apices, sparsely hirtellous, upper surfaces dark-green, somewhat shiny, subglabrous, lower surfaces dark-green, barely lighter color than the upper surfaces, somewhat shiny, sparsely pilosulous with some hirtellous hairs or subglabrous. Panicles usually small and rather loose on pilosulous or minutely pubescent peduncles. Pistillate Heads: 4.0-5.0 mm high, 2.0-2.5 mm wide, phyllaries 5-seriate, acute, the outer ones ovate and sometimes sparsely pilosulous, the inner ones linear-lanceolate and glabrous; filiform ray flowers 19-24, pappus 1.8-2.5 mm long, brown-tinged, corollas 1.2-1.7 mm long, green-white becoming purple at maturity, rather thickly puberulous above, the ligules erect, 0.1-0.4 mm long, glabrous, achenes 0.9-1.3 mm long, 2-3 nerved, shiny and finely hispidulous; disk flowers 2-3, pappus 2.2-2.6 mm long, corollas 2.3-2.8 mm long, green-white becoming purple at maturity, anthers sterile, achenes inane. Staminate Heads: ca. 4.5 mm high, 2.0-2.5 mm wide, phyllaries ca. 4-seriate; disk flowers 13-16, green-white becoming purple at maturity, pappus 2.3-2.5 mm long, tubes 1.2-1.5 mm long, puberulous above, limb 1.6-2.0 mm long, puberulous below, lobes oblong, barely linear or sometimes narrowly triangular, 1.0-1.2 mm long, the dorsal surfaces glabrous, style branches rhombic-oblong or lance-elliptic, acuminate, achenes abortive, reduced to small knobs.

Pollen diameters (microns): polar, 16.7-19.4; equatorial, 18.9-21.0; Pringle 6108.

Floral illustrations: Fig. 26.

The leaf morphology of the few known specimens of var. intermedia seem to be distinct from all other varieties of Archibaccharis hirtella. The leaves are quite small, ovate and nearly always coarsely serrate with rather long, entire acuminate or acute apices. The plants bear eglandular pubescence throughout. The floral morphology and probably also the habit closely relate the present variety to the other varieties of A. hirtella. The general appearance of the specimens indicate that var. intermedia is a vine or at least a

scrambler.

Pringle 9853 and Nelson 1471, referred to A. hirtella var. intermedia by Blake (1934, p. 434) have been cited as A. Schiedeana in the present treatment.

From Vera Cruz, Mexico, known only from Orizaba, the type location (Fig. 27). The only available ecological information was provided by C. G. Pringle, "shaded banks near Orizaba, 1313 m ele."

MEXICO: State of Vera Cruz: Orizaba, Botteri 1170 (BM, G, P, K).

20c. ARCHIBACCHARIS HIRTELLA (DC.) Heering var. HIRTELLA, Jahrb. Hamb. Wissensch. Anst. 21: Beiheft 3: 41. 1904. Baccharis hirtella DC., Prodr. 5: 418. 1836. Hemibaccharis hirtella (DC.) Blake, Contr. U. S. Nat. Herb. 20: 549. 1924. Type: MEXICO: without definite locality, between Apapulco and the city of Mexico, 1791?, Haenke s.n. (G-DC!; photo. GH! TEX!; isotypes: fragments, F?! P!; photo. of P isotype, MIN!).

Scandent vines; ca. 20-80 dm tall; glandular-pubescent; roots fibrous. Stems fractiflex, terete, the bases 3.0-15.0 mm in diam., graduating to 1.0-3.0 mm above, rather slender, the internodes 1.0-9.0 cm long, dull, gray, gray-brown, red-brown, brown or green, the branchlets usually green, glabrescent below, glandular-puberulous above, the sordid or purple hairs often thickly glandular. Leaves with short petioles, 1.0-6.0 mm long, glandular-puberulous with some pilosulous hairs; blades elliptic, lanceolate, lance-ovate or ovate, 2.5-7.5 cm long, 1.0-3.0 cm wide, thinly chartaceous or membranous, attenuate or obtuse at bases with ragged margins on the winged portions, acuminate at apices, margins distally serrate, serrulate or merely denticulate, sparsely pilosulous and glandular puberulous, sometimes with hispidulous hairs, upper surfaces dark-green, dull, usually thickly glandular-puberulous with scattered pilosulous hairs, lower surfaces lighter green, barely glossy, usually glandular-puberulous with scattered pilosulous hairs. Panicles small and convex on chiefly glandular-puberulous peduncles. Pistillate Heads: 3.5-4.5 mm high, 2.0-3.0 mm wide, phyllaries ca. 4-seriate, acute, the outer ones ovate or lanceolate and glandular-puberulous, the inner linear-lanceolate and becoming glabrous; filiform ray flowers 17-34, pappus 1.8-2.4 mm long, brown-tinged or white, corollas 1.4-2.0 mm long, green-white or becoming dark-purple especially above at maturity, usually thickly puberulous above with few hairs below, the ligules erect, 0.3-0.7 mm long, glabrous, achenes 0.8-1.4 mm long, 3-4 nerved, shiny and finely hispidulous; disk flowers 1-3, pappus 2.0-2.4 mm long, corollas 2.2-3.0 mm long, green-white or becoming dark-purple especially above at maturity, anthers sterile, achenes inane. Staminate Heads: 3.0-4.0 mm high, 2.0-3.0 mm wide, phyllaries ca. 3-seriate; disk flowers 18-36, green-white or becoming dark-purple especially above at maturity, pappus 1.8-2.4 mm long, brown-tinged or white, tubes 1.0-1.8 mm long, puberulous above,

limb 1.2-1.8 mm long, puberulous below, lobes oblong or barely linear, 0.9-1.2 mm long, glabrous except for occasional short hairs near the apices, style branches rhombic-oblong, short-acuminate or acute, achenes abortive, reduced to small knobs.

Chromosome number: n = 9 (Jackson, 1969), Fig. 2.

Pollen diameters (microns): polar, 13.9-17.8; equatorial, 15.5-18.9; Rzedowski 21690, Matuda 25749.

Floral illustrations: Fig. 26.

Archibaccharis hirtella var. hirtella may be separated from the other varieties of the species by the presence of glandular-puberulous hairs on the upper portions of the stems, petioles, leaf blades and phyllaries.

Blake (1924, p. 549) cited Baccharis scandens Less., B. Schiedeana and B. Thomasii Klatt as species synonymous with B. hirtella DC. His placement of these names was based mostly on study of original descriptions. Of those listed, Blake did view the isotype of B. scandens Less. at the Gray Herbarium and noted its glandular-puberulous character. The names listed above were not removed from synonymy. The types of these names have been studied by the author and have been determined to be conspecific with Archibaccharis Schiedeana, a species lacking glandular hairs.

Information provided by the Haenke collection as represented at the Field Museum, Chicago, indicated the date of collection as "1791" and a number "1228," perhaps the collection number. The fragments on the sheet match the holotype of var. hirtella very well and the date correlated with Haenke's journey from Acapulco to the city of Mexico (Hemsley, 1881, pp. 119-120).

Collectors have reported var. hirtella to be a shrub. My collection from Meson Viejo, state of Mexico, was clearly a vine.

Known from Mexico, D. F., Guerrero, Morelos and Oaxaca, Mexico (Fig. 27). Collected on rocky slopes, in pine-oak woods, in open woods and hillsides and on moist slopes, 600-3200 m ele.

MEXICO: Federal District: Eslaba region, Lyonnet 3009 (US); Lomas de Mixcoac, Lyonnet & Elcoro 1739 (US); mountains above Eslaba, Pringle 11483 (C, F, GH, K, MICH, MO, MSC, US); Cañada of Contreas, Pringle 13986 (G, GH, MICH, MIN, MSC, UC, US). State of Guerrero: ca. 10 km west of Camotla, Municipio of Chichihualco, ca. 40 km west of Chilpancingo, Feddema 2747 (MICH); top of Sierra Madre near Chilpancingo, Nelson 2238 (GH, US); Cerro Alquitrán, cerca de Mazatlán, Municipio of Chilpancingo, Rzedowski 23688 (MICH, MSC); Carrizal, 9 km west of Camotla, Municipio of Chichihualco, Rzedowski 18048 (DS, MICH, MSC). State of Mexico: Sacromote Hill, near Amecameca, Beauchamp s.n. MO933661 (MO); San Nicolás, Valley of Mexico, Bourgeau 955 (G, US in part, K, P); same location as the preceding, Bourgeau 957 (C, G); foothill, Mt. Ixtaccihuatl, Deam s.n. US398950 (GH, US); jungle, Amecameca, Goodding 2173 (GH, MO, NY, POM, UC); Los Hornos locality, District of Temascaltepec, Hinton 2110 (BM, G, K, MO, US); same location as the preceding, Hinton 2832 (BM, G, K, NY); Mesón Viejo, along Mexican Highway #130,

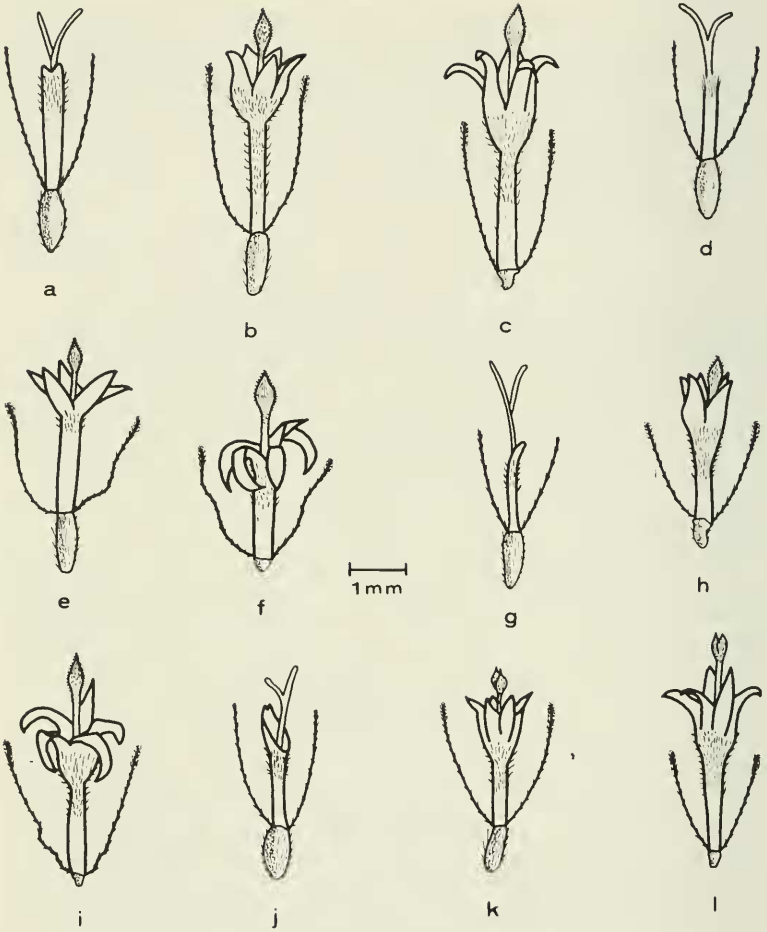


Fig. 26. Floral illustrations of the varieties of Archibaccharis hirtella. A. hirtella var. taeniotricha (all from Jackson 1042): pistillate heads: (a) filiform flower, (b) disk flower; staminate heads: (c) disk flower. A. hirtella var. albescens (all from Jackson 1025): pistillate heads: (d) filiform flower, (e) disk flower; staminate heads: (f) disk flower. A. hirtella var. intermedia (all from Pringle 6108): pistillate heads: (g) filiform flower, (h) disk flower; staminate heads: (i) disk flower. A. hirtella var. hirtella: (j, k) pistillate heads (Purpus 1499): (j) filiform flower, (k) disk flower; staminate heads: (l) disk flower (Jackson 1046). Disk flowers are shown without anthers.

Fig. 27. Distribution of the varieties of Archibaccharis hirtella in Mexico and Central America. Open square, A. hirtella var. taeniotricha. Triangle, A. hirtella var. albescens. Filled square, A. hirtella var. intermedia. Circle, A. hirtella var. hirtella.

Jackson 1046 (A, B, BM, C, DS, F, G, GH, K, MICH, MIN, MO, MSC, NY, P, POM, TEX, UC, US, WIS); San Rafael, Municipio of Tlamanalco, behind the paper factory, Jiménez s.n. MSC217564 (MSC); Cerro de Venacho, Valley of Mexico, Matuda 18800 (NY); Dinamo de Contreras, Valley of Mexico, Matuda 18675 (NY); Ozumba, Valley of Mexico, Matuda 25839 (NY, US); Cerro of the pines, Valley de Bravo, Matuda 27346 (NY); along brooks, Mt. Ixtaccihuatl, Purpus 18 (GH, MO, POM, UC, US); open woods and hillsides, Mt. Ixtaccihuatl, Purpus 1499 (BM, F, GH, MO, NY, P, POM, UC, US); 3 km southwest of Mesón Viejo, Municipio of Temascaltepec, Rzedowski 21690 (DS, MICH, MSC, TEX). State of Morelos: Huichilac-Cuernavaca, Juzepczuk 820 (US); Valley de Tepeite, Lyonnet 1482 (US). State of Oaxaca: between Llano Grande and Pinotepa, Nelson 2336 (GH, US).

21. ARCHIBACCHARIS SCHIEDEANA (Benth.) J. D. Jackson, Phytologia 28(3): 297. 1974. Baccharis scandens Less., Linnaea 5: 146. 1830. Not Pers. 1807. Baccharis Schiedeana Benth. in Oerst. Nat. For. Kjöbenhavn Vid. Medd. 1852: 83. 1852. Type: B, destroyed (D. E. Meyer, per. comm.). Lectotype: MEXICO: State of Vera Cruz: Jalapa, Aug., no year cited, Schiede 318 (GH!; photo. MIN!).

Baccharis elegans var. Seemannii Schultz Bip., Seem. Bot. Voy. Herald: 303. 1856. Type: MEXICO: Sierra Madre, N. W. Mexico, Seemann 2015 (K!; photo. MIN!; isotypes: GH! K!).

Baccharis Thomasii Klatt, Abh. Naturf. Ges. Halle 15: 326. 1881. Type: MEXICO: State of Vera Cruz: Orizaba, 1866, Thomas s.n. (P!; photo. MIN!).

Hemibaccharis torquis Blake, Contr. U. S. Nat. Herb. 20: 550. pl. 51. 1924. Archibaccharis torquis Blake, ibid. 23: 1508. 1926. Type: COSTA RICA: Prov. of San José: "hospice des alienes," San José, November 1892, Tonduz 1535 (US!; photo. MIN! UC!; isotypes: F! G! GH! NY! P!).

Scandent vines; ca. 20-100 dm tall; pubescence whitish or sordid; roots fibrous. Stems fractiflex, terete but the older portions sulcate between striations and hollow, lacking pith, the bases 0.3-1.0 cm in diam., stout, the internodes 0.8-8.0 cm long, dull, gray, green or brown below, gray-green or brown above, glabrescent below, persistently pilosulous or puberulous above. Leaves with petioles 1.0-11.0 mm long, pilosulous; blades mostly ovate, lance-ovate or rarely elliptical, 2.5-10.5 cm long, 1.0-5.5 cm wide, submembranaceous or thinly chartaceous, cuneate-rounded or cuneate to subobtuse at bases, acute to acuminate at apices, margins distally serrate to rarely entire, the upper surfaces dark-green, usually dull, evenly but thinly pilosulous and with scattered superficial whitish or amber glands, rarely subglabrous, the lower surfaces duller and lighter green and evenly pilosulous with scattered superficial glands. Panicles small and rounded, sometimes cymose, on pilosulous or puberulous peduncles. Pistillate Heads: 4.0-5.5 mm high, 2.5-3.5 mm wide, phyllaries 5(-6) seriate, acute, the outer ones lanceolate

and pilosulous, the inner ones lanceolate and glabrous; filiform ray flowers (17-)28-30(-50), pappus 2.0-3.1 mm long, brown-tinged, corollas short, 1.1-2.0 mm long, cream, whitish, green-white or green-white becoming purple at maturity, sparsely puberulous above, the ligules, if present, 0.1-0.5 mm long, achenes 1.0-1.3 mm long, 2-3(-5) nerved, shiny and hispidulous; disk flowers 1-3, pappus 2.4-3.8 mm long, corollas 3.0-4.0 mm long, anthers sterile, achenes inane. Staminate Heads: 6.0 (-7.0) mm high, 2.5-3.5 mm wide, phyllaries ca. 5-seriate; filiform ray flowers rarely present, reduced but apparently with fertile achenes; disk flowers 7-23, cream, whitish, green-white or green-white becoming purple at maturity, pappus 2.3-4.0 mm long, brown-tinged, tubes 1.3-2.7 mm long, puberulous above, limb 2.0-3.4 mm long, puberulous below, lobes linear, 1.4-2.7 mm long, the dorsal surfaces glabrous or sparsely puberulous near the apices, style branches oblong or linear, acute, achenes abortive, reduced to small knobs.

Chromosome number: 2n = 18 (Jackson, 1969); n = 9 (Solbrig et al., 1969).

Pollen diameters (microns): polar, 15.5-18.9; equatorial, 17.8-21.2; Jackson 1041, Smith P2045.

Floral illustrations: Fig. 29.

Vernacular names: "Cana cillo," (Dept. Chiquimula) "Culebrina" (Dept. Guatemala) and "Te Silvestre" (Dept. Retahuleu), Guatemala. Although no specimens from Honduras are known, the species may be expected there.

This species has been commonly confused with Archibaccharis hirtella var. hirtella. The two taxa may be separated by pubescence, the upper stems and branches of A. Schiedeana hairy but eglandular; A. hirtella var. hirtella puberulous with glandular hairs. The entire A. hirtella complex may be distinguished from A. Schiedeana by the shape of the style branches on the disk flowers: A. Schiedeana are always oblong or linear with acute apices and those of the A. hirtella complex are usually rhombic-oblong (at least not oblong or linear) with short acuminate apices.

On collector's labels, the habit of A. Schiedeana has been variously described as "shrub, vinelike, subscandent shrub, recurved shrub and tall herb." The author has studied populations in Mexico, Guatemala and El Salvador. In the early growth stages, the plant is weakly erect, without support, and has the appearance of a weak shrub or tall herb. In later stages, however, the plant is clearly a perennial woody vine, dependent for its support. No exceptions were seen.

The three binomials, Baccharis scandens Less., B. Schiedeana Benth. and B. Thomasii Klatt were erroneously included by Blake (1924, p. 549) in his list of synonymy under Hemibaccharis hirtella. That species was based on Baccharis hirtella DC. and as is indicated in the previous paragraph is distinct from A. Schiedeana. All these types were unknown to Blake except the isotype of B. scandens Less., examined in the Gray Herbarium (Blake, 1924, p. 549). Blake's (1926, p. 1508) Archibaccharis

torquis has similar characteristics and may now be referred to A. Schiedeana.

The name Baccharis Schiedeana was published by Bentham (1852). His intention was to rename B. scandens Less., a name he must have recognized as a later homonym for B. scandens (Ruiz. & Pavon) Pers., as he cited Lessing (1830). Article 32 of the International Code (Stafleu & Voss, 1972, p. 37) states a name is validly published when accompanied by "a reference (direct or indirect) to a previously and effectively published description or diagnosis of it." Thus, the epithet "Schiedeana" is regarded here as new and the oldest legitimate name. Two sheets of Oersted 61 (C) marked as "type of B. Schiedeana" represents the collection referred to only vaguely by Bentham when he listed the location. Article 7 of the International Code (1972, p. 19) states that "a new name or epithet published as an avowed substitute (nomen novum) for an older name is typified by the type of the older name." Therefore, the Oersted collection cannot typify the name B. Schiedeana. The type collection of B. scandens Less., Schiede 318, must also serve as the type of the epithet "Schiedeana" in its new combination in the genus Archibaccharis. Presumably the holotype of B. scandens was destroyed during World War II in Berlin where it was stored with other Compositae collections (Sleumer, 1949). According to Dr. D. E. Meyer (litt, July 1970) the holotype is not now in the Berlin-Dahlem Herbarium. A stem fragment of a pistillate plant bearing leaves and flowering heads (GH) has therefore been designated the lectotype.

Baccharis elegans var. Seemannii, which Blake (1924, p. 553 and 1926, p. 1509) from the original description regarded as doubtfully belonging to the genus Hemibaccharis may be typified. The holotype, Seemann 2015 (K) bears a note stating merely "Sierra Madre, N. W. Mexico." But reference to Seemann's Journal (1856) suggests the specimens may have been collected in the vicinity of Tepic, Nayarit. The general characteristics agree well with those of A. Schiedeana.

The type of Baccharis Thomasii was cited by Klatt (1881) as "DC. no. 134b." This specimen could not be located in the Prodromus Herbarium for the author. Possibly Klatt's number referred only to his chronological placement of the specimen before him within the Candolle number sequence. A specimen from the Drake Herbarium, Paris, determined as B. Thomasii by F. W. Klatt is undoubtedly the holotype. This is clearly A. Schiedeana.

From Nayarit and San Luis Potosi south to Chiapas, Mexico, Guatemala, El Salvador, Costa Rica and northern Panama (Fig. 28). Collected in moist forests and thickets, mostly along streams and on slopes, 600-3100 m ele.

COSTA RICA: Province of Alajuela: La Palma de San Ramón, Brenes 5824 (F); between Alajuela and Grecia, Brenes 17507 (F, NY); Volcán de Poas, Holway 366 (GH, MIN); Monte Aguacate, Oersted 61 (C, K, sketch GH); Zarcero, Smith H56 (F, MO); Zarcero, Canton Alfaro Ruiz, Smith P2045 (GH, UC). Province of

Cartago: Cartago, Oersted 10.988 (C); El Muneco on Río Navarro, Standley & Torres 51162 (US). Province of Heredia: north of Heredia, Brenes 13239 (F); between Poas and Barba volcanoes, Skutch 3444 (A, K, MO, NY, US). Province of San José: between Santiago and Pichacho Mondongo, Brenes 16958 (F); Guadeloupe near San José, Greenman & Greenman 5432 (MO); San José, Holway 253 (GH, MIN); near the mental hospital, San José, Pittier 1496 (GH); vicinity of La Verbena, Standley 32212 (GH, US); between San Pedro Montes de Oca and Curridabat, Standley 41288 (K, US); along Río Blanco, northeast of El Copey, Standley 41900 (US); vicinity of San Sebastian, south of San José, Standley 49318 (GH); San José, Tonduz 1549 (F, GH, K, P, NY, US). EL SALVADOR: Dept. Ahuachapán: near Ataco, Standley & Padilla 2661 (F); vicinity of Apaneca, Standley & Padilla 2998 (F). GUATEMALA: Dept: Alta Verapaz: Cobán, Jackson 1041 (B, BM, C, F, G, GH, K, MIN, MO, NY, P, US); between San Cristóbal Verapaz and Chixoy, Steyermark 43902 (F); Cobán, von Türckheim 1350 (F, G, GH, K, P, NY, US). Dept. Chimaltenango: between Chimaltenango and San Martín Jilotepeque, Standley 80898 (F). Dept. Chiquimula: Cerro Brujo, Steyermark 30937 (F). Dept. Guatemala: near Finca La Aurura, Aguilar 72 (F); Volcán Pacaya, Standley 58417 (F, MO); south of San Raimundo, Standley 62867 (F). Dept. Huehuetenango: east of San Rafael Pétzal, Standley 82861 (F, NY). Dept. Jalapa: between Jalapa and Paraíso, Standley 77314 (F); northwest of Jalapa, Standley 77509 (F, G). Dept. Jutiapa: Volcán Suchitán, Steyermark 31945 (F). Dept. Quezaltenango: Columba, Holway 826 (GH); Colomba, Skutch 1324 (A, F); Finca Helvetia, Skutch 1403 (A, F); near Calahuache, Standley 67121 (F, MICH); near El Muro, Standley 67167 (F, NY); Volcán Santa Maria, Steyermark 33549 (F). Dept. Quiché: Finca San Francisco, Skutch 1868 (A, F, NY, US). Dept. Retalhuleu: near Chivolandia, Standley 87211 (F); Puebla Nuevo, Stricker 228 (US). Dept. Sacatepéquez: Cuesta de las Canas, Standley 58857 (F, GH); near Antigua, Standley 61747 (F, GH). Dept. San Marcos: south of San Marcos toward Castalia, Williams, Molina & Williams 26176 (F, G). Dept. Santa Rosa: near El Molino, Standley 78383 (F). Dept. Suchitepéquez: Finca Mocá, Skutch 2118 (A, F, US). MEXICO: State of Chiapas: Chamula, Breedlove 7151 (DS, F, MICH); Rayón, Breedlove 11969 (DS, MICH); Chamula, Breedlove & Raven 13742 (MICH, NY); along Mexican Highway #195, 21 miles north of Highway #190, Jackson 1032 (A, B, BM, C, DS, F, G, GH, K, MICH, MIN, MO, MSC, NY, P, POM, TEX); Mt. Ovando, Jackson 1035 (F, GH, MIN, NY, US); Siltepec, Matuda S-39 (MICH, MO, US); Mt. Pasitar, Matuda 1544 (MICH). State of Guerrero: mountains west of Cerro Teotepec, Rzedowski & McVaugh 15 (MICH); along road to Taxco, Rzedowski 25226 (MSC). State of Hidalgo: Chapulhuacán, Kenoyer 733 (F, MO); around Palomas, Rzedowski 23339 (MICH, MSC, WIS); Chapulhuacán, Sharp 441767 (NY). State of Jalisco: Sierra de Manantlán, McVaugh 13880 (MICH); south of Talpa de Allende, McVaugh 21348 (MICH). State of Mexico: Nanchititla locality, Temascaltepec, Hinton 3089 (F, GH, K, MICH, MO, NY, US); northeast of Temascaltepec, Jackson 1049 (B, BM, C, F, G, GH, K, MICH, MIN, MO, MSC, NY, P,

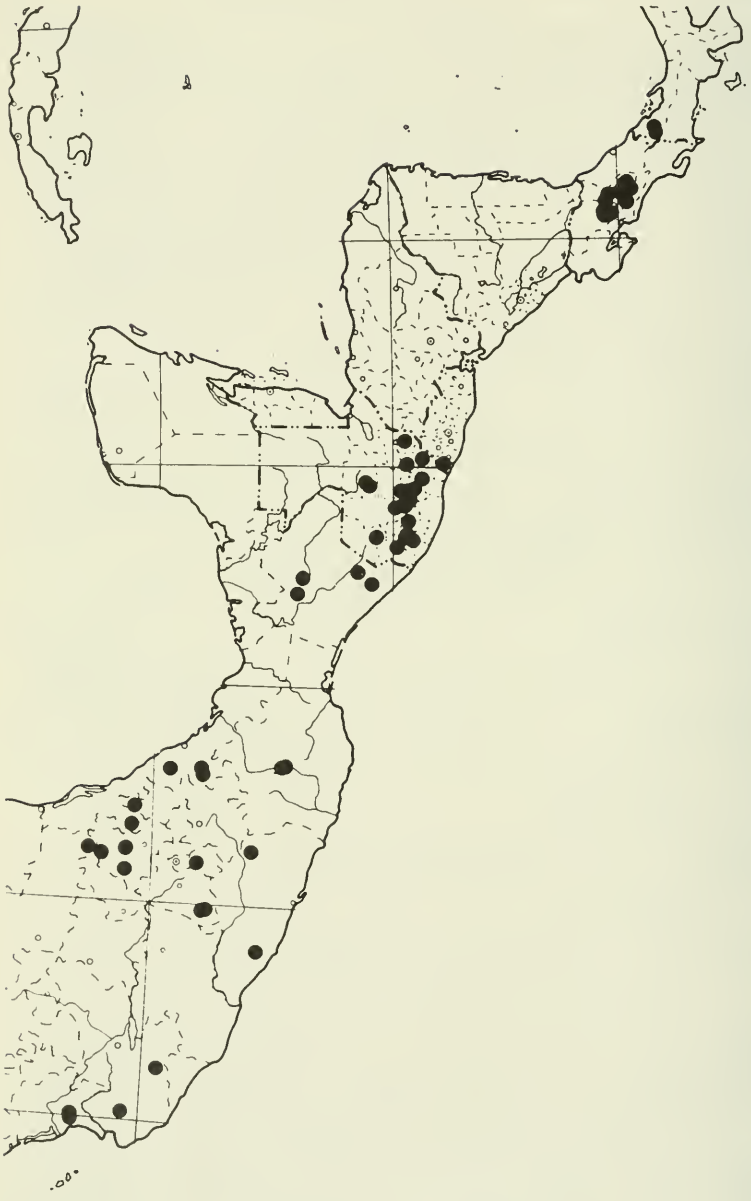

Fig. 28. Distribution of Archibaccharis Schiedeana in Mexico and Central America.

UC, US). State of Morelos: above Cuernavaca, Pringle 9853 (F, GH, K, MO, NY). State of Nayarit: east of Jalcocotan, McVaugh 13339 (MICH); Tepic, Palmer 1846 (F, GH, NY, US). State of Oaxaca: Cerro de San Felipe, Conzatti 704 (GH); Oaxaca, Conzatti & González 44 (GH, US); valley of Oaxaca, Nelson 1471 (GH, US). State of Puebla: Huauchinango, Fröderström & Hultén 741 (F, NY). State of San Luis Potosi: Xilitla, Rzedowski 9984 (MICH, WIS). State of Vera Cruz: Orizaba, Bilimek 516 (K, P); Orizaba, Botteri 490 (F, K); Orizaba, Botteri 1144 (BM, G, K, P). Valley of Córdoba, Bourgeau 1637 (G, GH, K, P, US); Orizaba, Müller 264 (K, NY, P); Zacualpan, Purpus 2198 (UC); near Rancho Viejo, Purpus 14086 (A, F, MICH, US); near Jalapa, Rose & Hay 6132 (US); Orizaba, Schaffner 335 (P). PANAMA: Dept. Chiriquí: pastures around El Boquete, Pittier 2855 (G, GH, NY, P, US); Volcán Chiriquí, Terry 1363 (F, GH).

22. ARCHIBACCHARIS FLEXILIS Blake, Journ. Washington Acad. Sci. 17: 60. 1927. Hemibaccharis flexilis Blake, Contr. U. S. Nat. Herb. 20: 549. 1924. Type: GUATEMALA: Dept. Alta Verapaz: Cobán, 1350 m ele., February 1907, von Türckheim II 1636 (US!; photo. MIN!; isotypes: BM! G! F! GH! MICH! MO! NY! US!).

Scandent twining vines; ca. 40-80 dm tall; sordid-pilosulous or sordid-pilose; rhizomatous. Stems noticeably twisted, fractiflex only in the branches and branchlets, terete, the bases 2.5-8.0 mm in diam., graduating to 1.0-3.0 mm above, slender, the internodes 2.0-14.5 cm long, dull, brown, dark-brown or reddish on the older portions, the branchlets usually green, glabrescent below, pilose or pilosulous above. Leaves with petioles 2.0-15.0 mm long, pilosulous, blades elliptic, ovate-elliptic or lance-elliptic, 3.5-13.0 cm long, 1.5-4.5 cm wide, submembranaceous, rarely chartaceous, cuneate or narrowly obtuse at bases, acuminate at apices, margins distally serrate or serrulate, hispidulous, upper surfaces dark-green, shiny, sparsely pilosulous or subglabrous, the hairs stiff at their bases, lower surfaces dark-green, shiny but less so than the upper surfaces, sparsely pilosulous but usually denser than the upper surfaces. Panicles small, compact and convex on pilose or pilosulous peduncles. Pistillate Heads: 5.5-7.0 mm high, 2.5-3.5 mm wide, phyllaries 5-seriate, acute, the outer ones ovate, then linear-lanceolate, these usually sordid-puberulous, the inner ones chiefly linear and glabrous; filiform ray flowers 16-25, pappus 2.9-4.3 mm long, brown or yellow tinged, corollas 3.0-4.1 mm long, white, green-white, light-cream and sometimes with a suggestion of pink, glabrous above, then thickly puberulous bands above the middle, glabrous below, the ligules erect, variable in length from essentially lacking to 0.1-1.0 mm long, glabrous, achenes 1.1-1.7 mm long, (3-)5 nerves, dull, finely hispidulous; disk flowers 1-4, pappus 2.8-4.6 mm long, corollas 3.8-4.8 mm long, white, green-white, light-cream and sometimes with a suggestion of pink, anthers usually sterile but apparently sometimes partially functional, achenes inane. Staminate Heads: 5.0-7.5 mm high, 2.5-

3.5 mm wide, phyllaries 5-seriate; filiform ray flowers occurring sporadically, 0-8, pappus 2.7-3.0 mm long, brown or yellow-tinged, corollas 2.4-3.7 mm long, white, green-white, light-cream and sometimes with a suggestion of pink, achenes apparently fertile; disk flowers 10-21, white, green-white, light-cream and sometimes with a suggestion of pink, pappus 3.0-4.4 mm long, brown or yellow-tinged, tubes 1.4-2.9 mm long, puberulous above, limb 2.5-3.6 mm long, puberulous, lobes linear, 2.2-3.0 mm long, the dorsal surfaces puberulous, style branches usually linear, rarely oblong, acute, achenes abortive, inane or reduced to small knobs.

Chromosome number: n = 9 (Jackson, 1969).

Pollen diameters (microns): polar, 18.3-23.3; equatorial, 18.9-24.4; Williams, Molina & Williams 23702, Williams, Molina & Williams 26083.

Floral illustrations: Fig. 29.

Archibaccharis flexilis shares some vegetative characters with A. hirtella var. taeniotricha and some floral characters with A. Schiedeana.

A. flexilis is a tall vine which is found suspended high in the trees. This species is distinct from all other taxa of Archibaccharis with its brown, twining, twisted stems and thin, shiny leaves.

Reports of "arching shrubs" on collector's labels may indicate that A. flexilis can be found as a weak, erect plant without support in early growth stages, cf. discussion of A. Schiedeana. The author's collection, Jackson 1040, was found with the plants first prostrate, spreading rhizomatously on the forest floor. The plants rose sharply as scandent, twining vines high into the trees.

Jackson 1040 was collected when the plants were in the bud stage. The anther sacs in at least some of the disk flowers of the pistillate heads were found to be partially functional. Few anther sacs were available but a chromosome count was obtained. Good illustration of these chromosomes was not possible.

Known from Chiapas, Mexico through Guatemala, El Salvador, Nicaragua and Costa Rica (Fig. 30). This woody vine has been collected mostly in wet thickets and moist, cloud forests, 500-3000 m ele.

COSTA RICA: Province of Alajuela: Colinas de San Pedro de Ramón, Brenes 20333 (F, NY); upper limit of tropical zone, region of Zarcero, Smith H.13 (F, MO); Zapote, Smith H479 (F); Tapera de Zarcero, Smith NY1229 (F, GH, NY); Cerro del Esirito Sauto, Naranjo locality, Canton Naranjo, Smith P2411 (GH, K, UC). EL SALVADOR: Dept. Santa Ana: Cordillera Miramundo, mountain of Montecristo, Molina, Burger & Wallenta 16865 (F, GH). GUATEMALA: Dept. Alta Verapaz: .3 miles south of Cobán along road #17, Jackson 1040 (A, B, BM, C, DS, F, G, GH, K, MICH, MIN, MO, MSC, NY, P, POM, TEX, UC, US, WIS); near Cobán, Standley 69340 (F, GH); near San José, southeast of Tactic, Standley 69673 (F); Saquijá, 43 km northeast of Cobán, Standley 70201 (F); above Tamahú, Standley 70926 (F); Cobán, von Türckheim 854 (US); Cobán, von Türckheim 8405 (F, GH, K, NY, US). Dept. Chimaltenango:

Quisaché, Standley 62291 (F, MICH, NY). Dept. Quezaltenango: Finca Azucena, above Colomba, Standley 68019 (F); region of Las Nubes, south of San Martín Chile Verde, Standley 83617 (F); along road above Santa María de Jesús, Standley 84861 (F); along old road between Finca Pirineos and Patzulín, Standley 86836 (F). Dept. Sacatepéquez: hills of Finca Carmona, southeast of Antigua, Standley 63698 (F, GH, US); slopes of Volcán de Agua, above Santa María de Jesús, Standley 65058 (F). Dept. San Marcos: lower to middle slopes of Volcán Tajumulco, between Todos Santos and Finca El Porvenir, Steyermark 36998 (F); Volcán Tajumulco, between Finca La Patria and "Todos Santos Grande," Steyermark 37700 (F); on slopes of Cerro Tumbador, about 15 km west of San Marcos, Williams, Molina & Williams 23062 (NY); near Aldea Fraternidad, between San Rafael Pie de la Cuesta and Palo Gordo, Williams, Molina & Williams 26083 (NY). Dept. Suchitepéquez: south slope, Volcán Atitlán, Skutch 1482 (A, F, US); southern slopes of Volcán Zunil, vicinity of Finca Las Nubes, along Quebrada Chita, east of Pueblo Nuevo, Steyermark 35399 (F). MEXICO: State of Chiapas: Mt. Ovando, Matuda 2639 (GH, MICH, NY, US); Mt. Ovando, Matuda 4005 (MICH, NY); Mt. Ovando, Matuda 16235 (MO, US). NICARAGUA: Dept. Granada: forest on Mombacho Volcano, Williams & Molina 20049 (F, NY). Dept. Jinotega: Ocotillo near St. Lastenia, Cordillera Central de Nicaragua, Williams, Molina, Williams, Gibson & Laskowski 27840 (UC). Dept. Matagalpa: road to Aranjuez, Cordillera Central de Nicaragua, Williams & Molina 20146 (F, NY); between Disparate de Potter and Aranjuez, Cordillera Central de Nicaragua, Williams, Molina & Williams 23702 (GH, NY); near Jinotega Rock Quarry, 5 km north of Sta. Maria de Ostuma, Cordillera Central de Nicaragua between Matagalpa and Jinotega, Williams, Molina & Williams 23943 (GH, NY); about 6-10 km northeast of Matagalpa, road to El Tuma, Williams, Molina & Williams 24050 (BM); road to La Fundadora, north of Sta. Maria de Ostuma, Cordillera Central de Nicaragua, Williams, Molina & Williams 24896 (NY).

## Excluded Names

The holotypes for the binomials listed below were personally studied by the author.

Archibaccharis prorepens Blake, Journ. Wash. Acad. Sci. 24: 432-433. 1934. This is Baccharis prorepens (Blake) J. D. Jackson, Taxon 19(2): 262-263. 1970.

Conyza Thesiifolia H.B.K., Nov. Gen. & Sp. 4: 75. 1820. This binomial was cited by Blake (1924, p. 554) as possibly belonging (from description) to Hemibaccharis. My examination of the holotype at the Paris Museum of Natural History indicated that this plant is actually a species of Conyza.

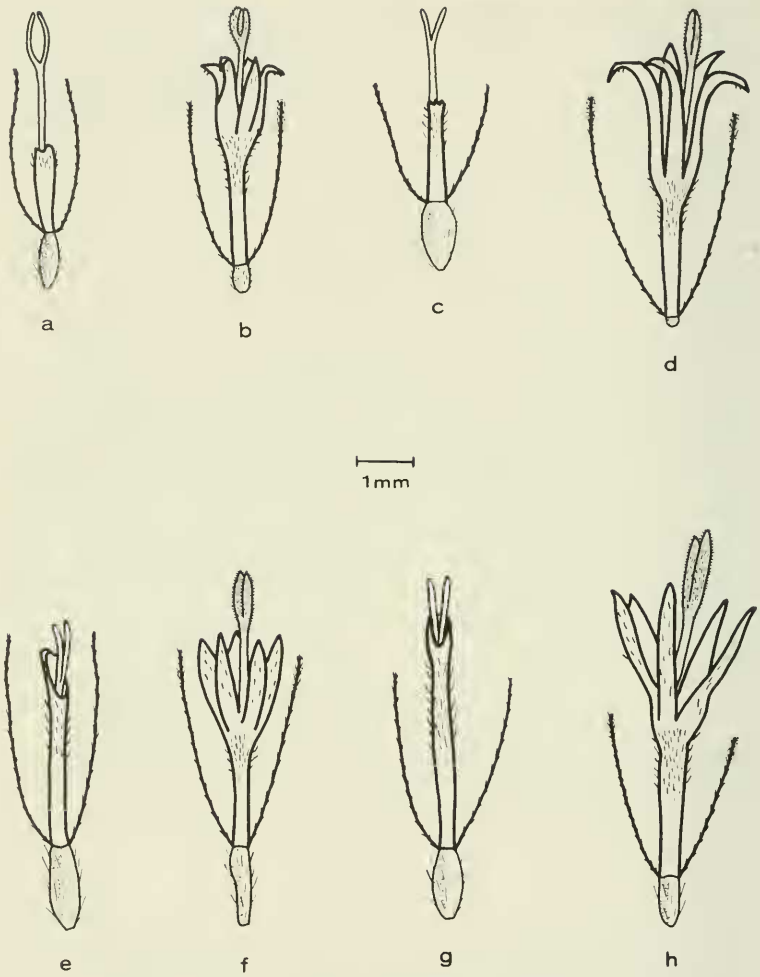


Fig. 29. Floral illustrations of Archibaccharis Schiedeana and A. flexilis. A. Schiedeana: (a, b) pistillate heads (Tonduz 1535): (a) filiform flower, (b) disk flower; staminate heads: (c) filiform flower (Stricker 228 ), (d) disk flower (Pittier & Tonduz 1549). A. flexilis (all from von Türckheim II 1636): (e, f) pistillate heads: (e) filiform flower, (f) disk flower; (g, h) staminate heads: (g) filiform flower, (h) disk flower. Disk flowers are shown without anthers.

Fig. 30. Distribution of Archibaccharis flexilis in Mexico and Central America.

Index to Exsiccate

This index lists all collections seen and classified during the preparation of this paper. A dash (___) appears where collection numbers were not available. Numbers in parentheses indicate the number of the taxon in this paper to which the collections were referred.

Galeotti, H. 2179 (18); 2210 (21); 2308 (12); 2321 (18).
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Holway, E. W. D. 21 (12); 32, 46 (8); 253, 366, 403, 446, 826, 3673 (21); 3756 (20c).
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Hunsaker, D. ___ (11).
Iltis, H. & Iltis. 1660a in part, perhaps taxon 3b.
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_____ & W. C. Burger & B. Wallenta. 15984 (12); 16124 (8); 16277 (12); 16397 (6); 16446 (5); 16641 (6); 16865 (22); 16990 (19).
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_____ & A. Molina R., T. Williams. 22818, 22843 (6); 22860 (12); 22866 (8); 22916 (6); 22923 (8); 22998 (16); 23055 (4); 23062 (22); 23111 (4); 23158 (6); 23186 (20); 23702, 23943, 24050, 24896 (22); 25474 (6); 25815 (4); 25866 (8); 26083 (22); 26176 (21).
_____ & A. Molina R., T. P. Williams, D. N. Gibson, C. Laskowski. 26773 (8); 26806 (4); 27051 (8); 27840 (22).
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